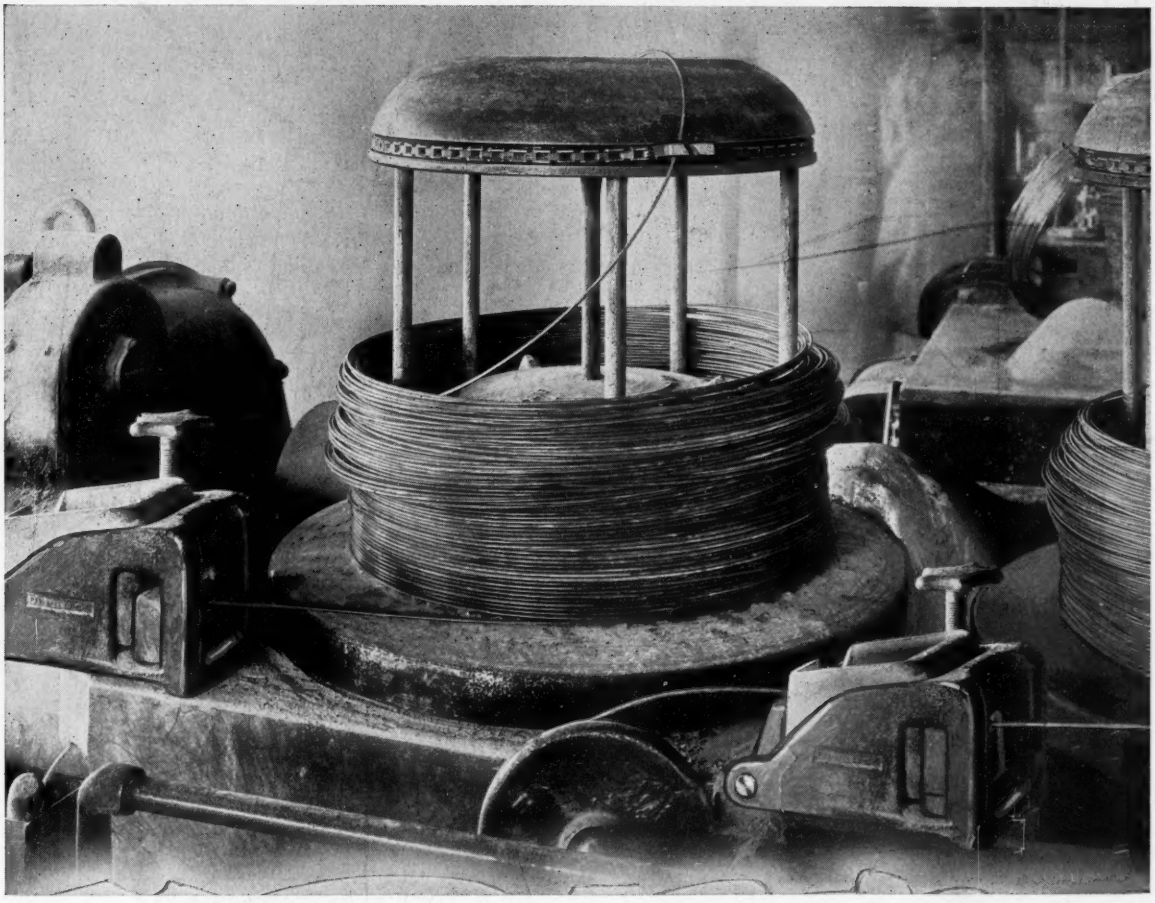
WIRE
& WIRE PRODUCTS



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July 1930

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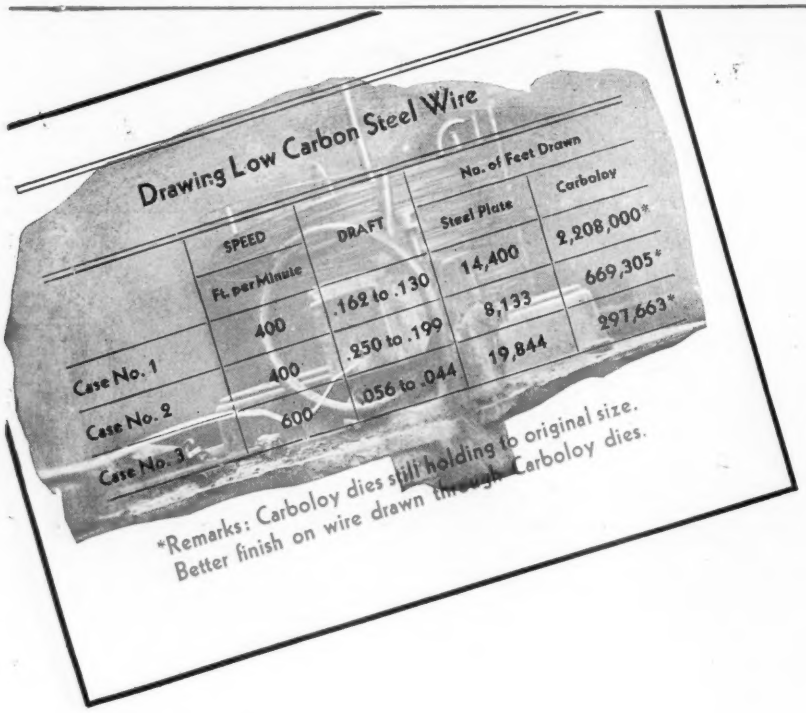

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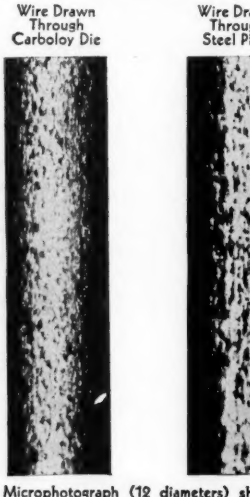

Microphotograph (12 diameters) showing better finish on wire drawn through Carboloy Die at large New Jersey mill. See page 10, Vol. II., No. 2, CARBOLOY.

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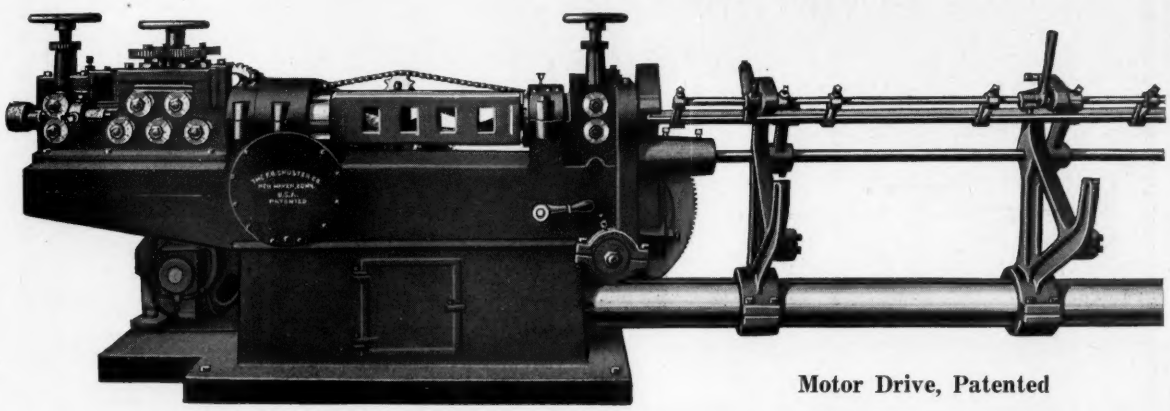

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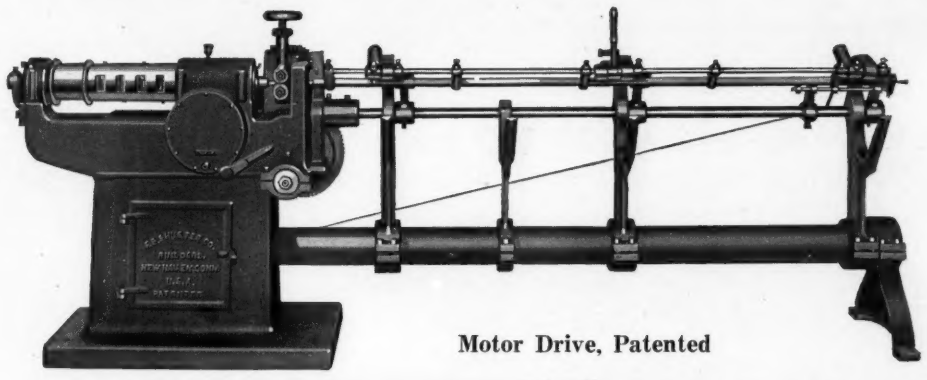

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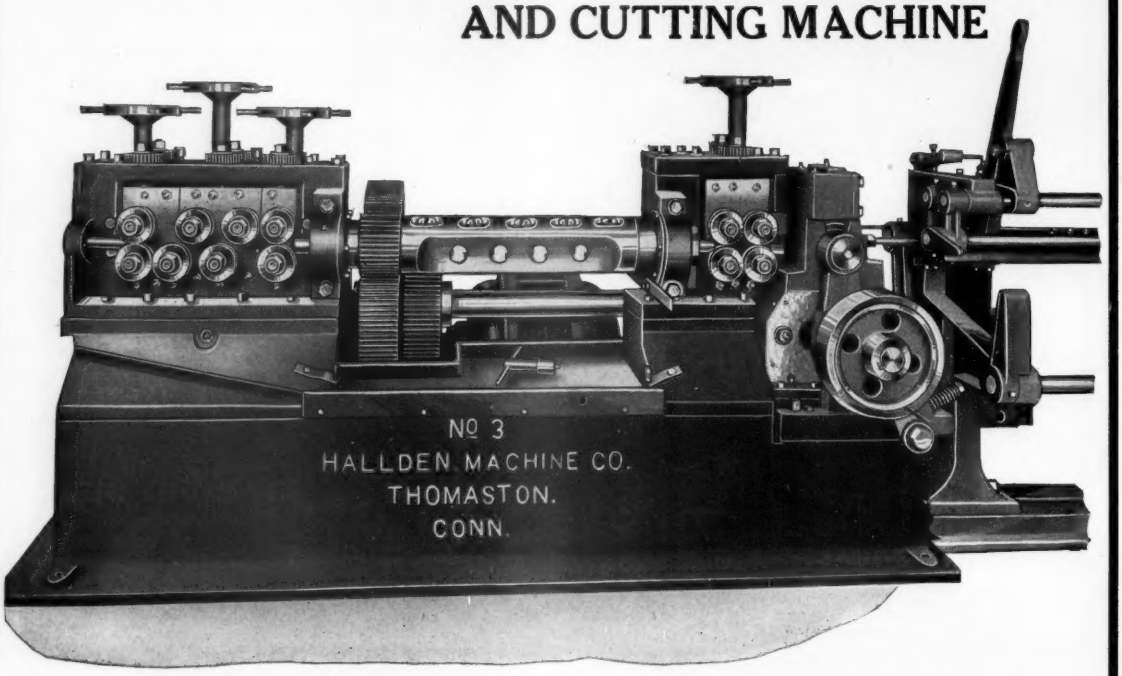

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L. D. Granger, Asst. to Vice-President, Wickwire-Spencer Steel Co., New York, N. Y.

G. D. Hartle, General Manager, Sleeper & Hartley, Inc., Worcester, Mass.

Roland M. Hussey, Supt. of Wire Mill, Jones & Laughlin Steel Corp., Aliquippa, Pa.

E. P. Jacob, Supt. Heat Treating & Cold Drawn Central Alloy Steel, Div. Republic Steel Corp., Canton, O.

E. W. Kempton, Educational Director, American Steel & Wire Co., Cleveland, O.

W. F. Knoll, General Superintendent, Jas. Pender & Co., Ltd., St. John, N. B.

Robert T. Korb, Pres. & Treasurer, Audubon Wire Cloth Co., Audubon, N. J.

John Mordica, Superintendent, Bethlehem Steel Co., Sparrows Point, Md.

George Paff, Supt. Rod & Wire Dept., Wheeling Steel Corp., Portsmouth, O.

William D. Pierson, Secretary Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

E. J. Poole, Vice-Pres., of Operations, Carpenter Steel Co., Reading, Pa.

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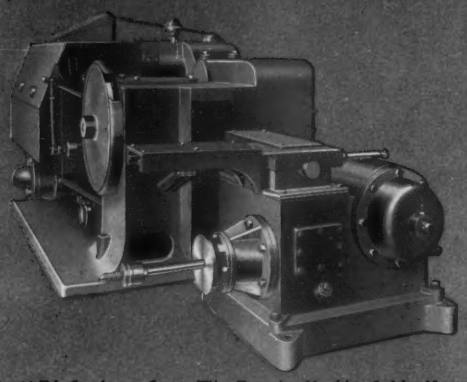

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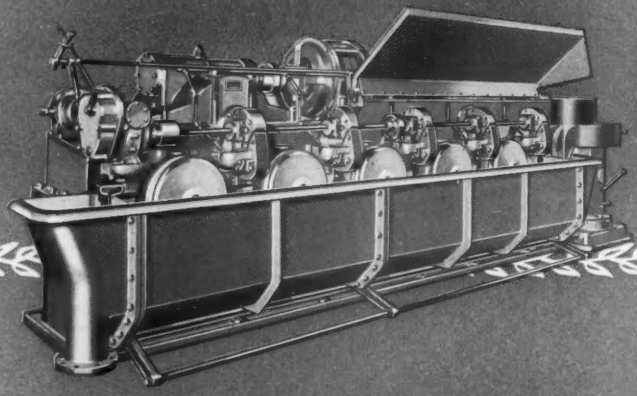

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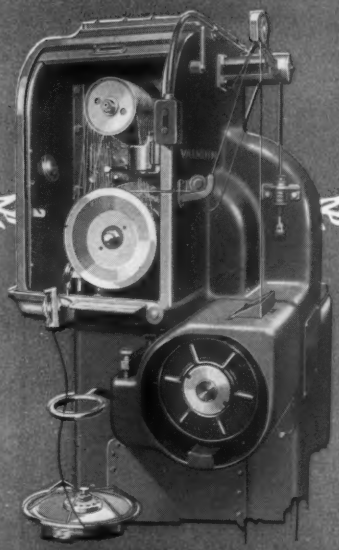

No. 2—12 Die Continuous Copper Wire Drawing Machine, finishes No. 17 B. & S. Gauge, and smaller, at 2500 Ft. P. M., overall dimensions 6' x 3'. (Patented)

WIRE & WIRE PRODUCTS

A monthly publication devoted to wire drawing and wire forming

Vol. 5 July 1930 No. 7

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WIRE
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Devoted to the Production and Fabrication of Wire

Vol. 5 JULY, 1930 No. 7

Wire Day and Show Big Successes

Large Turnout of Deeply-interested Wire Men Make Buffalo Displays Successful --- Move for Wire Association Initiated

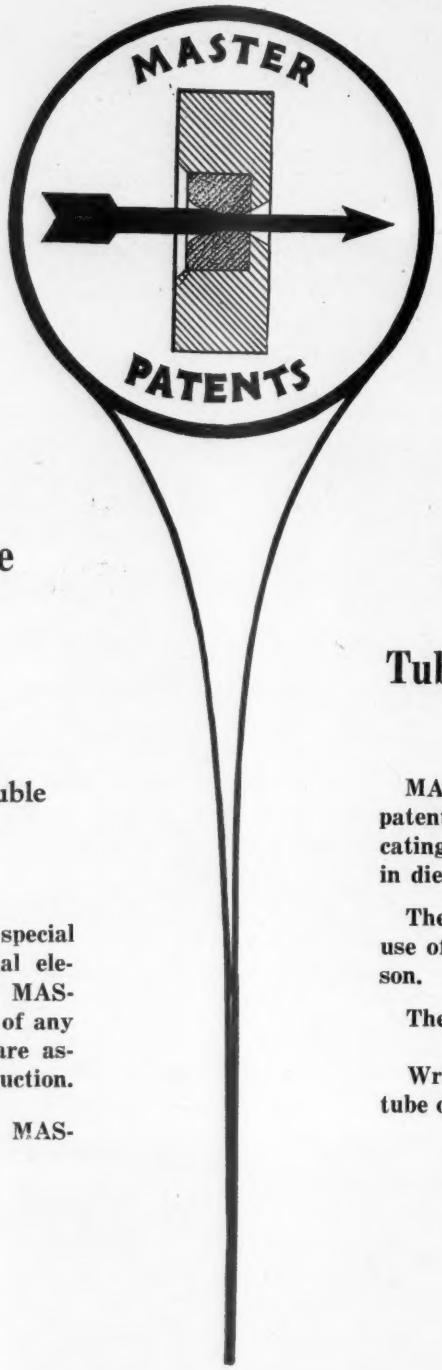
By Morris A. Hall

WHAT may prove to be one of the most epochal moves in the history of wire drawing and the wire industries was taken at the meeting of the wire division at Buffalo on Wednesday, June 18. At the most enthusiastic meeting of wire executives held then and there, in conjunction with the annual gathering and exposition of the Association of Iron and Steel Electrical Engineers, it was proposed than an association be formed to further the best interests of wire men and the wire industries. This proposal was very well received and when an informal vote was taken on the subject, only two opposing ballots were cast in approximately 195 total votes.

Preliminary steps toward organization were taken in the appointment of a large general committee of men prominent in all wire lines and representing all metals and materials. Subsequent to the meeting, this big committee met and after discussing the subject and presenting the personal opinions of its members, a small committee of four was delegated to draw up a general outline and submit this at an early date. The enthusiasm manifest all along the line insures the success of this long-needed project, which its sponsors earnestly believe will be of great assistance to executives and practical men in the production and manufacturing end of the wire industries.

The exposition was held at the large Broadway Auditorium and the many and varied exhibits filled this space almost completely, this being more than double the amount of exhibit space occupied by the previous exhibitions. Appearing for the first time were the wire industry exhibits, these filling half of the outside west aisle and half of the south end aisle. The latter included two large spaces in which wire was drawn throughout the time the exposition was open, and these booths and the spaces in front of them were filled with interested

One of the Most Attractive Exhibits in the Wire Group at the Buffalo Exposition, Display of Wire-drawing Machinery by Morgan Construction Co.



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Automatic machinery of special design eliminates the personal element in the manufacture of MASTER DIES. Exact duplicates of any die in any quantity desired are assured by this automatic production.

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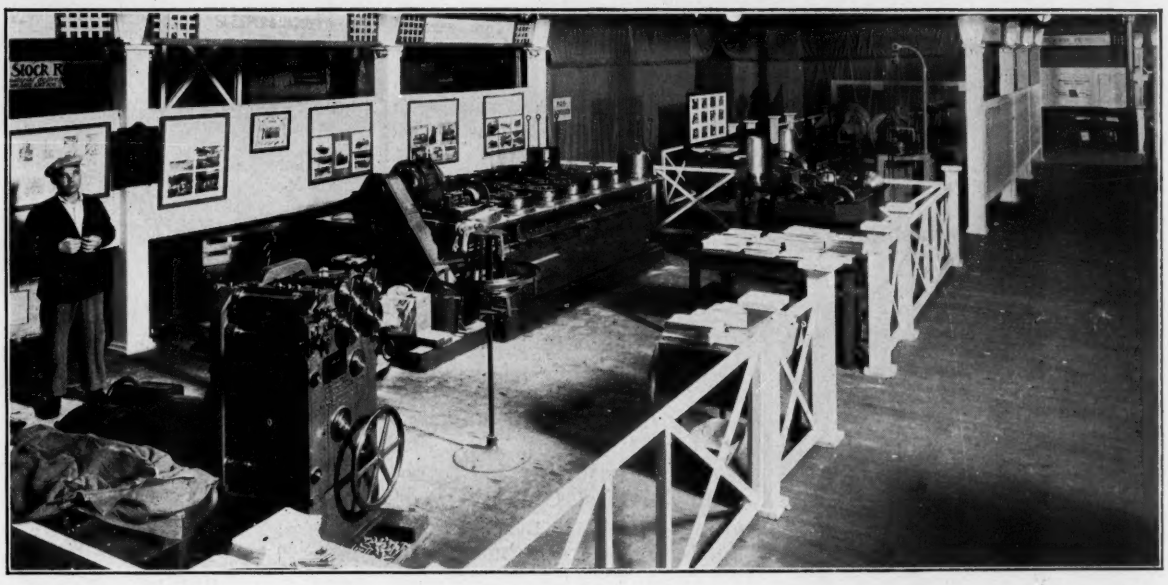
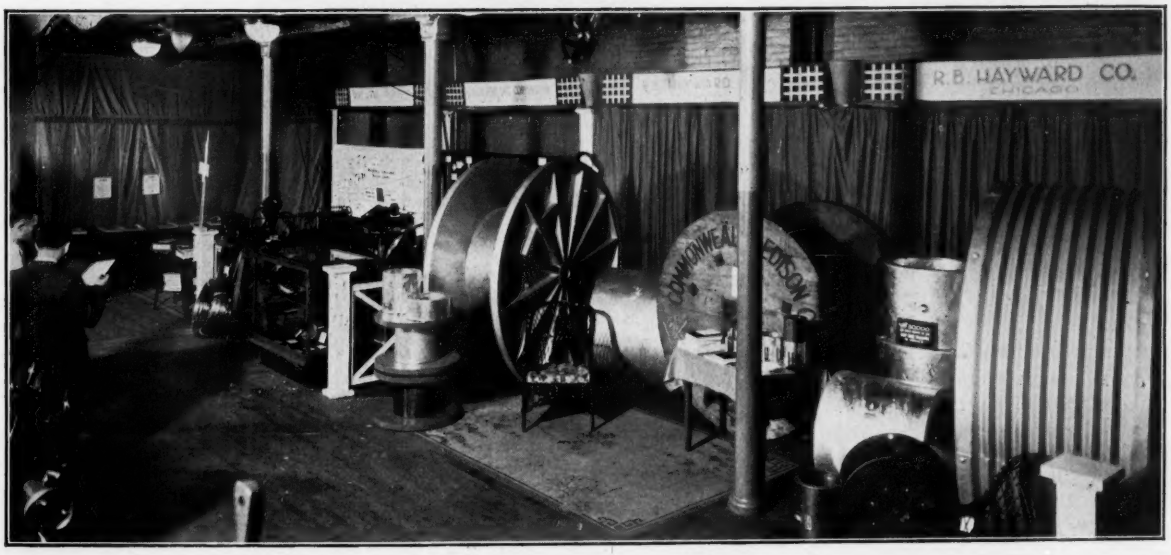


Above, the South Aisle of the Buffalo Auditorium Showing Displays of Commercial Machines Drawing or Working Wire. At Right, One of the Smaller Displays of Interest to Wire Men, That of Wire-drawing Dies, as Well as Equipment for Piercing Diamond Dies, for Polishing Dies, etc. Below, the West Aisle Showing Additional Wire Displays. Unfortunately the Layout of the Hall Prevented Including the Ironsides Co's. Display. This Was Positioned on the West Aisle off to the Right of Those Shown and Directly Across from the Large General Electric Display.



men almost all of the time.

Interest in the exposition began with the opening Monday, June 16, but reached its height as well as its maximum attendance on wire day, Wednesday, June 18. From a strictly business standpoint, all the wire exhibitors did very well, negotiating contracts and making many new and valuable connections. These exhibits can be seen in the illustrations herewith.

Technical meetings were held in the Hotel Statler, Niagara Square, the Iron and Steel Engineers meeting in the small ball room. The wire meeting was held in the Iroquois room. This provided seats for more than 100 but so many wire men came that additional seats were needed to fill the room to and beyond its capacity, all sides, aisles and back of the room being crowded, with men standing. It is estimated conservatively than 200 were present.

These men showed their great interest in the proceedings by remaining in this overcrowded and not-too-well ventilated room from 9:30 until nearly 2. For the benefit of those not present the general order of the proceedings was about as follows: The moving picture "The Making of Steel and Steel Wire" was run off first, starting promptly at 9:30, this being accompanied by an interesting talk and explanation of parts of the picture by E. W. Kempton, educational director, Amer. Steel & Wire Co.

This was followed by the first paper, "Drawing Wire Rods," by Kenneth B. Lewis, Morgan Construction Co. This was really a description of the world's wire-drawing practices as noted by Mr. Lewis on recent business tours of various American and foreign countries and will be found elsewhere in this issue under such a title. The discussion which followed was participated in by a large number of practical wire drawers, and this discussion, the practical value of which can not be disputed, will be presented in the August issue.

Then, W. H. Spowers, Jr., galvanizing consultant of New York, presented his paper on "Galvanizing". This, too, will be found elsewhere in this issue and the discussion will be printed in August. He was followed by Clarence S. Arms, consulting engineer, associated with Sleeper & Hartley, Inc., who spoke briefly on "Recent Developments in Wire Drawing and Forming Machinery." This will be found elsewhere in this issue, complete, but the discussion of it will be printed next month.

Finally, after a talk on Monel metal and its uses, by C. D. Grover, representing the International Nickel Co., a film of that title was presented. It was short, only two reels, but proved very interesting and instructive.

Between papers, the movement for a wire organization was launched by Richard E. Brown, of Wire and Wire Products, and later a vote on the general proposal was taken. Subsequent to the meeting, the large general committee, appointed by the chair as a result of suggestions from the floor, met, organized and appointed the sub-committee as noted above. Subsequent progress will be described in full in these pages, inasmuch as Wire and Wire Products will act as the official organ for this association, the helpful possibilities of which can not be denied.

Among those wire men registered at the wire meeting, or prominent at the exposition on wire day were:

American Brass Co., Waterbury, Conn.—Clark Judd, Vive President; Mr. Yeates and Mr. Bassett. Buffalo, N. Y.—Mr. Lockwood.

American Coil Spring Co., Muskegan, Mich.—E. W. Bitzer, President.

American Lime & Stone Co., 122 E. 42nd St., New York, N. Y.—R. L. Hamaker, Sales Department; Mr. Snyder.

American Pulley Co., Philadelphia, Pa.—W. A. Richards at 140 So. Dearborn St., Chicago, Ill., Chg. Reel & Spool Dept.

American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.—Paul J. Bairstow, Office, Vice-Pres; F. C. Elder, Metallurgist; E. W. Kempton, Educational Director. 132 Hawthorn St., Swissvale, Pa.—E. H. Broden, Mgr. Pittsburgh Dis. Waukegan Works, Waukegan, Ill.—W. E. Acomb, Superintendent. Worcester, Mass.—F. L. Haven, Asst. Superintendent. 1230 Marquette Road, Cleveland, O.—Chas. F. Kempert, Superintendent. Rankin Braddock Works, Braddock, Pa.—Henry R. Patterson, Superintendent.

American Wire Die Co., 12 Parker Street, Worcester, Mass.—Earle R. Vickery, President.

Atlantic Steel Co., Atlanta, Ga.—C. L. McGowan, Supt. Rod & Wire Depts.

Atlantic Wire Co., Branford, Conn.—Wm. E. Hitchcock, President.

Barnes Co., Wallace, Bristol, Conn.—G. C. Wilcox.

Bates Steel & Wire Co., Monessen, Pa.—John D. Geiser.

Bernitz, J. I., 47 West St., New York, N. Y.—I. J. Bernitz, Wire Mill Machinery Importer.

Bethlehem Steel Co., Sparrows Point, Md.—John Mordica, Superintendent. 1100 McKinley Ave., Johnstown, Pa.—Clifford T. Ward, Asst. Supt. Rod & Wire Dept. 121 St. James Pl., Buffalo, N. Y.—J. Arthur Joseph.

Broderick Bascom Rope Co.. 4203 N. Union Blvd., St. Louis, Mo.—H. K. Hammerstein, Chief Engineer. 4203 N. Union Blvd., St. Louis, Mo.—John K. Broderick, President.

Buffalo Forge Co., Buffalo, N. Y.—Fred Yahn, Engineering Dept.

Buffalo Technical High School, Clinton and Cedar Streets, Buffalo, N. Y.—Ed. Sawers, Teacher, Eng'g.

Canadian Steel & Iron Co., Hamilton, Ontario, Can.—Mr. Greene; Mr. Donnel.

Carboloy Company, Inc., 1770 E. 45th Street, Cleveland, O.—James R. Longwell, Research Engineer. 1370 Ontario St., Cleveland, O.—Arthur A. Merry, District Manager.

Carborundum Co., Niagara Falls, N. Y.—Mr. Stack. Mr. Jackson.

Carpenter Steel Co., Reading, Pa.—Francis J. Conway, Supt. Wire Mill; Paul B. Greenawald, Metallurgical Dept.; E. J. Poole, Vice President Operations.

Clark Controller Co., Cleveland, O.—R. A. Watson, Chief Engineer.

Cohn, Sigmund, 44 Gold St., New York, N. Y.—A. H. Rosenbaum, Superintendent.

Columbia Steel Corp., Pittsburgh, Calif.—Mr. Ryan, Superintendent.

Comstock & Westcott, Niagara Falls, N. Y.—Geo. J. Everill.

Consolidated Aircraft Corp., Buffalo, N. Y.—J. M. Guinn, Engineer.

Consolidated Wire Works, Biel, Switzerland—Th. H. Kappeler, Chief Engineer; Mgr. 25 Church St., New York, N. Y.

Copperweld Steel Co., Glassport, Pa.—M. Govola, Wire Mill Foreman; Leslie C. Whitney, Chief Metallurgist.

Crucible Steel Co., Syracuse, N. Y.—C. P. W. Christiansen, Supt. Wire Mill.

Dominion Iron & Steel Co., Ltd., Sydney, Nova Scotia—H. M. Hyndman, Supt. Wire Mills.

Driver-Harris Co., Harrison, N. J.—M. J. Gorman, Production Engineer; Harry McKinney, Works Mgr.

Eaton Spring Corp., Detroit, Mich.—Chas. D. Beans, Asst. Gen. Mgr.

E. H. Edwards Co., San Francisco, Calif.—Martin H. Gerry, Pur. Agent.

(*Please turn to page 283*)

The World's Wire Drawing Practice

Methods being used outside of the United States, including Canada, Mexico, Great Britain, Sweden, Etc.

*By Kenneth B. Lewis**

UNUSUALLY good opportunities have come to me in recent years to check details of wire drawing practice in foreign countries, and have seen many curious and interesting things. Access to foreign mills, particularly to European mills, is difficult, and there are many jealously guarded secrets in European practice, but I am confident that I can, without violating any confidence, make up an account of practices that are common to all foreign mills, but entirely new to American wire producers.

Canada

So far as wire drawing practice is concerned, Canada can be considered practically domestic territory. Wire drawers and wire mill executives shift back and forth across the border and there is no more difference between American and Canadian mills than there is between two wire mills in the same town. possibly the greatest difference is in character of the labor, which is generally better in Canada. The wire drawers are largely native Canadians and they not only work for less money per day but produce more wire. Production averages, I should say, 20 to 25 per cent greater than in the United States. I am speaking of course of production by single draft methods, where the difference between skilled and unskilled labor is considerably greater in terms of production than in the case of continuous wire machines. Canadian wire mills work chiefly with the common products, particularly fence wire. The galvanizing practice always seemed to me particularly good.

Mexico

Mexico is a wire producing country. The present output is small and the cost is high, but the government shows an inclination to protect its native steel industry in all branches. At present the products are plain wire and nails. No galvanizing is done, but it will doubtless be attempted before long. Mexico is a large importer of barb and field fence. All recent Mexican administrations have done everything possible for the farmer, and galvanized fence has come in free, but on the other hand the same administrations have shown a distinct desire to aid the development of the steel industry of Mexico and it is generally believed that when Mexican mills are producing galvanized fence in commercial quantities from Mexican wire drawn from Mexican rods which are rolled from Mexican steel, there will be adequate tariff protection granted. The difficulty is that the industry will probably have to establish itself before it can get protection.

There are several reasons for the high cost of Mexican wire. Wire rods are now produced in a small way in two Mexican plants and the duty on imported rods is very heavy. Domestic rods until recently, have been available only in size ⅜ inches and this means that for most finished sizes there must be an annealing and a second cleaning, coating and baking. Sulphuric acid costs from 7 to 9c a pound. Coal averages $15.00 a ton and in the only installation which I checked up, it took a ton of coal to anneal a ton of wire. It will be readily seen that these large rods probably impose a $20.00 extra burden on Mexican wire. Arrangements have been made recently for the rolling of ¼in. and even of no. 5 rod but I am not sure whether they are yet available. Labor of course is very cheap according to our standards but is not particularly productive. This is partly due to a natural disinclination to work hard in a very hot climate, but I really believe that it is due more to poor wire mill practice and a lack of skilled and experienced supervision and that these matters will be rapidly corrected.

Drawing practice in Mexico is American practice as far as Mexicans have been able to understand to apply it. Output per man is very low and the product in most cases has been inferior but the Mexicans are eager to learn how to better their product and practice and I have found them very quick to accept advice on this point. The mill equipment is in general, very good. It is largely of American manufacture and the few foreign items that I saw were scheduled for replacement.

The first time I stepped into a Mexican wire mill, I saw an eight-block rod bench being operated by sixteen men, eight-block fifteen frame with eight wire drawers and seven men making dies. This force working three 8 hour shifts, was producing 7 tons a day, all of which was really scrap. On my next visit 2 years later, ten wire drawers and three die makers were turning out 30 tons a day, an increase in output per man of almost exactly 10 to 1, and where at the time of my first visit they were making scrap on slow running blocks, on my second visit I found them mak-

*Morgan Construction Co., Worcester, Mass. Paper read before Wire Division, Assn. Iron & Steel Elec. Eng.'s Exposition & Convention, Buffalo, N. Y., June 18.

ing perfect wire on high speed continuous machines. People who improve at this rate will bear watching.

A man going into a Mexican wire mill as a trouble shooter, or in fact into any foreign wire mill, should be well grounded in the fundamentals of every one of the many details that make up wire mill practice. There are many small matters which, in a going plant, are taken care of in a manner established many years ago and are running along more or less automatically under the supervision of some old timer. No one else bothers about them. In wire mill practice, however, every detail is significant. In a foreign mill nothing can be taken for granted. You may have to ream dies, grind reamers, fix up an emergency inhibitor, slack lime, mix a lubricant, redesign reels, or teach greenhorns how to strip a block without losing both ends of the wire. Nerve and determination will take you a long way but you must have some definite idea of the whys and wherefores before you begin to tamper with these operations. Another bit of advice I would offer is, when you start hunting for trouble, never stop until every possible chance has been explored. Don't stop when you think you've got it; go right on. I was asked to find out in one of these Mexican mills why all the coating fell off the wire in the second or third draft. This they told me was the only trouble they experienced. If this could be corrected, they felt that they would be a long way ahead. I agreed with them. I discovered that they never took the band wires off the rods before they went into the cleaning tub, in fact the band wires were taken off for the first time by the wire drawer at the ripping block. I found that the baker was lukewarm. I found the dies were entirely without bearings. I found that the first draft was made by a man who had no further responsibility for the wire. I found this man ripping rods at 100 revolutions per minute. I found that the die was set in the box in such a way as not only to drag the wire sharply over the edge of the die but to drag it over the edge of the die box. Here were six faults, each serious enough to be chargeable for their difficulty and as I checked each one I was tempted to stop and call it a day. I kept on a little further however and found the big trouble. The lime, which I examined in the bin, where by the way they were accustomed to leave it from 2-3 months before slacking, was full of grit. Some lumps that I picked up had nearly as much silica as lime. The local belief was that all these rocks went to the bottom of the cleaning tub and made no trouble. I did not share that belief. I will repeat that in a foreign wire mill, absolutely nothing can be taken for granted.

Great Britain

British wire drawing practice is essentially our own practice. An American wire drawer could step into a British mill and make a day's pay the first day; in fact he could make a week's pay the first day if the Union would let him. The most striking feature of British wire drawing practice is the low output per man. In 14 gage for example, 2,000 lbs. is a good day's work and the Union restricts a man to two blocks. This compares with a country-wide average in America of 4,500-5,000 lbs. in ordinary single draft practice, o possible 6,000 lbs. average production with big bundles and mechanical stripping, and from 9,000-14,000 lbs. in continuous drawing. Other noted differences in practice are intimately connected with this retriction in output. Wire drawing in Great Britain is still a jealously guarded craft. The wire drawer sets his own dies. He frequently has an apprentice bring up the rods and to strip, tie up and carry away the wire. No conveniences are supplied to increase his production and this is quite natural as he would not be allowed to increase his production in any event. The pointer may be a hand operated pointer or it may be no more than a hammer and anvil. A pull-out device consisting of the old-fashioned cam and lever arrangement is considered quite advanced practice. It is common to find a lever pivoted in the top of the bench a few inches ahead of the die and provided with a pair of tongs a few inches above the bench level. The man uses one hand to shift these tongs along the point and with the other he pumps the the lever back and forth getting about 1 inch of point at each stroke. The rigging is more or less like the emergency brake of an automobile. In the very early days of wire drawing, a device of this sort constituted the only means of drawing coarse wire. In fact this is the origin of our term "breaking down" as applied to the preliminary drafts on coarse wire. "Braking" is the proper spelling. Plenty of British wire mills can be found in which there are no trucks. The wire drawer or his apprentice walks into the baker and comes out with a coil of rod on his shoulder and the finished wire is carried away to the warehouse in the same manner. Such mills are generally so crowded that there would be no room for trucks.

I know that this description is unjust to many British wire mills some of which are decidedly more modern in layout and equipment, but differences are always more interesting than similarities. It is really unfair to compare American with British practice in the common products. Great Britain is not strong in the common products. She has very little business in these products and it is getting less. Formerly large tonnages of nail, fence, and products of this nature went to the British Dominions but the Dominions are now for the most part taking care of their own requirements in wire products. Canada has her own wire industry. Australia is well taken care of. Wire is drawn in India. South Africa has at least one fair sized mill and New Zealand has the matter under consideration. In the general export market, Great Britain is at a disadvan-

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Recent Developments in Wire Drawing and Forming Machinery

Influence of Rod and Die Quality of Continuous-Machine Performance---Changes in Operating Methods

By Clarence S. Arms *

IT is rather a difficult problem to tell of anything particularly new in the art of wire drawing.

Wire drawing is one of the oldest arts of which we have any record, and, according to these records, the first wires produced in a commercial way were drawn through dies. The same process as you all know is used today.

The newest developments are in the line of a better prepared raw material, larger bundles, better dies and continuous drawing.

Wire mills are demanding more than ever, from the steel makers, a better wire drawing steel, more uniform in quality from heat to heat; and even with the very best steel available today, the wire mill has a problem on its hands to finish the same into a satisfactory wire with a minimum of loss. This uniformity in quality is growing more important every day as the new dies are being perfected and continuous drawing being so widely adapted. We shall see later in our discussion how dependant the success of continuous drawing is on the quality of the raw material furnished to the drawing machines.

Many Different Types of Machines

Within the past few years quite a number of different types of continuous machines have been developed for drawing from the rod to various intermediate finished sizes. These machines have proved to be very successful, and a great money saver to the wire mill. Give them a satisfactory rod and equip them with the best alloy dies and the possible production per man hour is nearly doubled over the production when single holing. Give them a poor rod of non-uniform quality and dies that soon wear out and they are almost useless. Great progress has been made of late in the quality of steel available, and even more progress in the life of dies furnished, no one need hesitate today to adopt continuous rod machines in any mill whose product is suitable for continuous drawing. We mentioned above the importance of quality and dies to the success of continuous rod machines. When a rod machine is once strung up and running, the speed of the finishing block will average about twice the speed possible when drawing the same work single draft, however, if the wire breaks or the dies cut out, causing a shutdown of the machine for rethreading, then a portion, if not all the advantage of the continuous drawing and higher finishing speed is lost. There is available today a very good quality of No. 5 rods in bundles weighing 400 lbs., and alloy dies whose records of productions are really quite remarkable, particularly to one used to working with cast iron dies, through which we were lucky to finish 150 lbs. to a true gage. With these two factors so much improved I predict a great future for continuous rod machines.

Footage Needs of Fine Wire Tremendous

While the tonnage requirements of sizes suitable for finishing on continuous rod machines is far in excess of the tonnage requirements for finer sizes, still the footage of the fine sizes is tremendous, and it is with the finer sizes that this paper is more particularly concerned. For example, assuming the average rod bundle weighs 300 lbs., and is drawn to .080 in. we have from this bundle 17,574 feet of finished wire; if this same bundle is finished to .036 in. we have 86,700 ft.; and if drawn to .010 in. we have 1,124,700 ft. This is in the ratio of 1 to 58 to 290 to 3,749. And to use average man hour productions one man running two rod machines drawing .080 in. will provide enough process wire to keep three men finishing .036 in. and operating nine machines also twelve men with seventy-two machines finishing .010 in.

The intermediate machines have one advantage over the continuous rod machine. Unsuitable raw material can be rejected. If rods do not draw well on the rod machine it is always advisable to divert this material to other uses, and not attempt to finish into finer sizes. Then again, raw material drawn to, we will say, .080 in., annealed and cleaned, comes to the intermediate machines in fine condition for continuous drawing. Inferior material having been rejected, the wire free from defects, true to gage, and of uniform temper due to the annealing.

When we come to the problem of the continuous drawing of the finer sizes, say from .080 to .028 in., and again from .028 to .010 in., either high or low carbon wire, the multiple draft machine shows to its best advantage. One of the limitations in any wire drawing operation

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*Consulting engineer, Sleeper & Hartley, Inc., Worcester, Mass. Paper read before Wire Division, Assn. Iron & Steel Elec. Eng.'s Exposition & Convention, Buffalo, N. Y., June 18.

Galvanizing Prevents Metallic Decomposition

Close Relation between Life and Rust—Zinc Chloride and Dross Formation—Oxide Elimination—Bonding Layers

*By W. H. Spowers, Jr.**

AS a preface to a detailed discussion later I am about to give a short review of the whys and wherefors of galvanizing because I wish you to reason with me from the beginning and to be in a position to visualize the theory upon which I predicate the recommendations which follow later.

It is to be understood then that one of the most persistent problems which confront the worker in iron and steel is the prevention of corrosion. We cannot rid ourselves of the agents which effect the corrosion of iron without at the same time ridding ourselves of the agents which are essential to life itself.

Air is indispensable both to human respiration and for the formation of rust and other oxides, for which it supplies the oxygen; moisture is necessary for the formation of clouds, which make the earth fertile, and it also supplies the medium in which rusting takes place and hydrates the oxide; carbonic dioxide is an animal by-product and a raw material for the vegetable world, and the exchange of carbonic dioxide and oxygen, which is continually taking place between the animal and the vegetable kingdom, is of vital importance. Then, on the other hand, rust is not readily formed, if at all, unless there be an acid present, and the acid which is most universally distributed is carbonic acid, or hydrated carbonic dioxide.

Closer Relation Between Life and Rust

There is, as you see, a close relationship between the processes of living and rusting, but, while human beings make up for the rusting or decaying of their tissues by nutrition, it has not yet been discovered how to feed or regenerate iron, and until such a discovery is made we are compelled to take our cue from the ancient Egyptians and resort to embalming.

There are two general ways of embalming iron as to prevent its decomposition, which might be called, respectively the metallic and non-metallic methods. In the non-metallic method the articles are coated with an organic substance, usually oil, or varnish, the efficiency of which depends on its being more or less airtight; when coloring matter is added to the oil it becomes a paint, but I understand from authorities on the subject that a varnish free from pigments is preferable to anything else.

Pure Metal Does Not Oxidize Easily

The metallic method consists of coating the iron with some other metal, and it is this method in which we are interested. Iron rusts less easily than does steel; this is perhaps due to steel being a very composite material. In the iron, which forms the bulk of its composition, are dissolved or immersed a great variety of other substances; some of these are simple, such as graphite, silicon and maganese, and others are compound, such as carbides, sulfides, phosphides, and silicides. The carbon compounds are very numerous and diversified, being due to the different heat treatments; the best known are cementite, pearlite and martensite. Just as variety is to some people the spice of living, so is hetrogeneous composition the spice of rusting, in the present instance at any rate.

It is difficult for many persons to understand why zinc is the best rust preventive for iron and steel, and they believe it is on account of its cheapness that it is so extensively used. They have an idea that lead would answer far better, and as it is more non-corrosive than zinc, would protect the iron better. But the softness and difficulty of application react against the use of lead.

The very fact that zinc is a corrosive metal does not affect its properties when applied as a coating to iron or steel. Indeed, if it did not corrode, it would not be of value for such a purpose. When iron or steel which has been coated with zinc is exposed to the atmosphere, a galvanic action is set up, although, of course extremely slight. Any two dissimilar metals form a galvanic couple, but as zinc is the most electro-positive metal, the galvanic action between the zinc and iron is as great as could be obtained when iron is used for one of the metals composing the couple.

Zinc Corroded, Saves Iron

The result is therefore, that with the slight galvanic action set up on galvanized iron or steel, when exposed to the atmosphere, a corrosion takes place. Did it not follow, then ing is, therefore, on account there would be no protection. In this case, the zinc, being the electro-positive metal, suffers corrosion at the expense of the electro-negative metal iron. The effect is that the corrosion goes on with the zinc exclusively and the iron is not corroded at all, provided any zinc is left on it.

*Consulting Engineer on Galvanizing, 551 Fifth Ave., New York, N. Y.

**Paper presented at Wire Division of The Iron & Steel Exposition, Buffalo, June 18, 1930.

The reason for the protection of iron or steel by a zinc coating is, therefore, on account of the fact that the zinc corrodes at the expense of the iron or steel by the galvanic action set up. Zinc, however, when exposed to the air, does not corrode rapidly, even with the galvanic action set up, so that it lasts for a far greater length of time than would naturally be expected. The very fact, however, that the zinc corrodes at the expense of the iron is all that is necessary to protect the iron or steel, even though it be extremely slight.

Other metals like lead or tin, on account of their not being electro-positive to iron, do not act like zinc. They act simply as a covering like a paint or varnish, and if portions of the iron happen to be exposed, even such as a pinhole, the iron begins to corrode. With a zinc coating, however, this will not take place.

The process of galvanizing is: First, cleaning. The steel is immersed in dilute acid, until all the dirt, rust or oxide is removed. It is then thoroughly washed; then dipped in a fluxing acid; dried, and brought to the galvanizing kettle. Upon the thoroughness of the cleaning process depends to a great extent the successful results. The work must be presented to the galvanizer as virgin iron uncontaminated by any foreign substance.

Zinc Absorbed Into Metal Pores

The work is immersed in the zinc and permitted to remain until it "thaws out", or comes to the same temperature as the zinc; it is then removed. The work has acted like a sponge and expanded with the heat of the kettle, it has absorbed the zinc into its pores assisted by the coating of fluxing acid, then when removed and cooled it "sets" on contracts leaving the zinc as a hard and fast coating.

Because this discussion must be very limited in time I have chosen five subjects to touch on, all of which have been requested.

(1) Use of Zinc Chloride
(2) Formation of Dross
(3) Elimination of Zinc Oxide.
(4) Effect of Alloy Layers on Bonding
(5) Straight Wire Installations

Because of the fact that the use of zinc chloride as a flux medium is so directly connected with the formation of dross the subjects under discussion of zinc chloride and formation of dross will be taken up together. It must be understood that the greatest manufacturers of dross in galvanizing are the salts resulting from the use of the pickling acid. These are high in iron and of such a nature as rapidly to contaminate fluid zinc and turn the zinc into dross. As a matter of fact fully 75% of the dross made in the galvanizing operation where active fluxes such as hydrochloric are used is because of these iron salts. Of the dross manufactured 15% comes from the work itself passing through the zinc and 10% from the contamination from the sides of the kettle.

It can be readily seen then that if we eliminate the iron salts resulting from the pickling action of the active acids we will reduce our dross consumption very materially.

Combined Picking and Fluxing

Where, in some cases, the pickling operation is combined with the fluxing operation in one tank of hydrochloric or a combination of sulphuric and hydrochloric acid the richer this bath becomes in iron as a result of the pickling action the richer and therefore more active do these salts which are left on the work become and therefore more dross.

These salts effect also a widening or thickening of the interlining alloy layers between the zinc coating and the iron which results in an improper bond between the zinc and the iron producing an easily flaked or broken coating.

I find in the use of zinc chloride as a bath flux a very effective reduction in the width of these alloy layers because of the elimination of muriatic salts. I will go into the effect of these alloy layers a little later.

How Zinc Chloride Is Used

The details for the use of zinc chloride are as follows:—

In the first place the wire must be thoroughly washed after leaving the hydrochloric bath in order to remove the iron salts resulting from the use of this pickle. Upon the thoroughness of this washing operation will depend to a large extent the success of the procedure. The water used in this washing operation should be constantly renewed to effect a thorough and accurate cleansing. A temperature may be maintained in this bath in order to have a uniform procedure throughout the pickling and fluxing operations.

The work must then be promptly immersed in zinc chloride before there is a chance for it to rust and dry.

The zinc chloride should be kept at 28° Bé and a temperature maintained to aid in drying. The zinc chloride should be acidulated with just enough hydrochloric to remove the cloudiness which is normal in neutral solutions of zinc chloride. The acidulation should not be carried beyond this point unless excessive spitting is found upon the immersion of the wire in the zinc. Then before entering the bath the wire can be dried with the use of a drying plate at the end of the kettle, providing care is taken not to carry the drying beyond the point where the zinc chloride becomes "greasy" or "tacky" on the surface of the iron. I have found in some cases because of limited space for proper drying facilities or because of speed in operation that excessive spitting will result. This may be controlled by raising the hydrochloric acid content in the zinc chloride bath. I have found that as high as 2% hydrochloric content will have no effect on the dross accumulation but would not advise a higher degree of acidulation. In conjunc-

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Anti-friction Bearings in the Equipment for Making Wire, II

Roller Bearings on Roughing and Finishing Stands Drawing Blocks, Stranders and Other Machines

*By F. Waldorf**

(*Continued from page 244, June Issue*)

In the preceding installment, the Author showed typical bearing mounts in roll necks of a breakdown mill, pinion stands for rod mills, finishing stands, motor-driven wire - drawing blocks (main and driving shafts, also worm gear speed reducer shaft), and cone-type continuous machines. Besides showing typical bearings and their mounts, these were described in some detail, with facts on their adjustments, lubrication and other practical use pointers. In this installment other wire drawing equipment with anti-friction bearings is shown and described in a similar manner.

IN the case of the machine shown in Fig. 6 the mountings are quite different, owing to the difference in character and volume of the loads imposed. On the main drive worm wheel shaft the outboard bearing consists of two tapered roller bearings, mounted so as to hold the shaft rigidly. The inboard bearing, which also carries the overhanging load of the fixed and free running drums is a self-contained, double row bearing of greater capacity. The mounting on the intermediate gear shaft consists of two tapered roller bearings at one end, and a straight roller bearing at the other. This arrangement permits the gear a certain amount of float, so that it can align itself between the two rigidly held drive gears. The mounting on the other drum shaft is precisely similar to that already described. It can be seen that, in both cases the closures at the drum ends of the main shafts are quite evidently designed to prevent any danger of lubricant leaking out and getting onto the drums.

*District Manager, Steel Mill Division, The Timken Roller Bearing Company.

Wire Stranders

The anti-frictionizing of wire stranding, or cable machines is one of the later developments in the design of wire making machinery. Nevertheless it presents features of considerable interest from a performance standpoint. It has been found that the power requirements are much less than with a plain bearing machine, and that the machine can be run as speeds materially higher. The illustrations showing the method of mounting bearings at various points are taken from a three-section, 37 strand machine recently completed and put in service. Figure 7 shows the mounting developed for the bobbin cradle shafts, and the crank that drives them. The crank pin mounting consists of two bearings, of which the cups are pressed into the hubs, and located by means of a spacing ring. The bearing cones are given a light fit on the shaft, and the whole set up is held firmly in place by means of the adjusting nut on the end of the pin. The mounting of the bobbin shaft proper consists of double row, self-contained bearings at both ends. The bearing nearest the crank is fixed, while that at the far end is allowed to

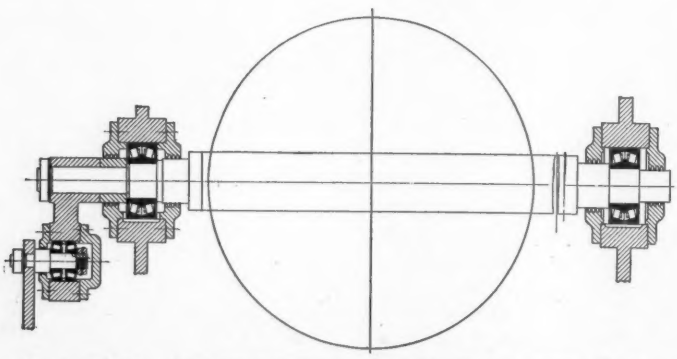

Fig. 7 (at left). Longitudinal Section through Main Shaft of Cabling Machine.

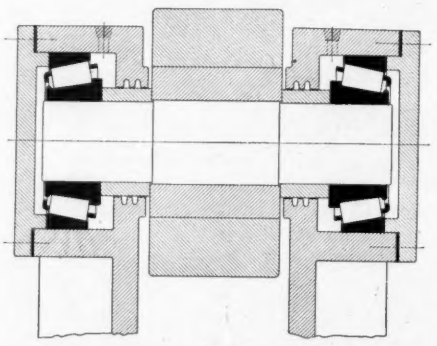

Fig. 8 (at right). The Bearings on One of the Minor Shafts.

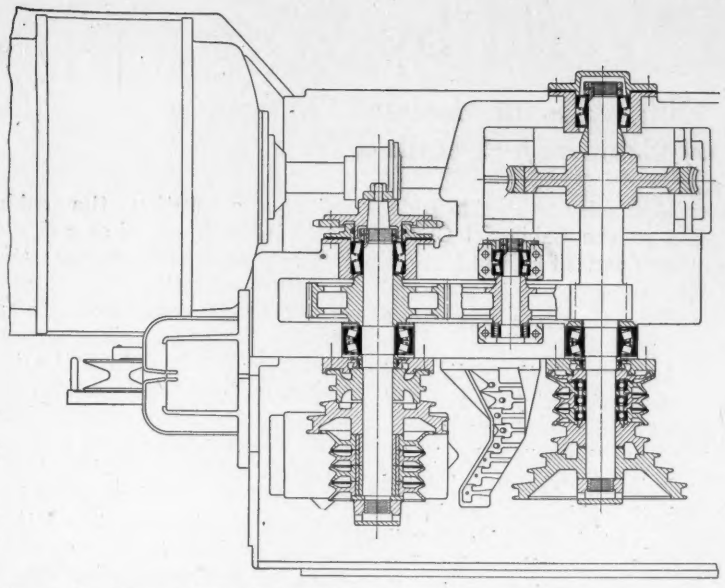

Fig. 6. Arrangement of Bearings on Cone-type Continuous Machine.

float in the housing, to provide for a certain amount of lateral movement of the shaft. The closures in all cases are quite simple, but are designed so that there is a liberal storage space for reserve lubricant. Thus lubrication requirements are reduced to a minimum as far as attention and frequency of renewals are concerned.

Figures 8 and 9 show the mountings used for the trunnion rollers that support the bays, or bobbin sections, and on the capstan shaft, respectively. Both mountings are quite simple, that for the trunnion rollers (Fig. 8) consisting of a single bearing at each end of the shaft. The cones are pressed on the shaft, and the cups given a light fit in the housing. The bearings on each end are individually located by shims between the housing and the outer closure. The mounting for the capstan is much the same, except that the cups are pressed into the hub, against shoulders machined to receive them. The cones are given a light fit on the shaft, and the whole set up is adjusted from one end by means of a sleeve which bears on a nut on the end of the shaft. In both cases there is liberal provision for the storage of reserve lubricant. In this particular machine, the taping heads, the drive shafts, and the line shafts that transmit power to the three bays, are all equipped with anti-friction bearings. But a description of the individual mountings is hardly necessary, since it would merely be a repetition of what has already been given.

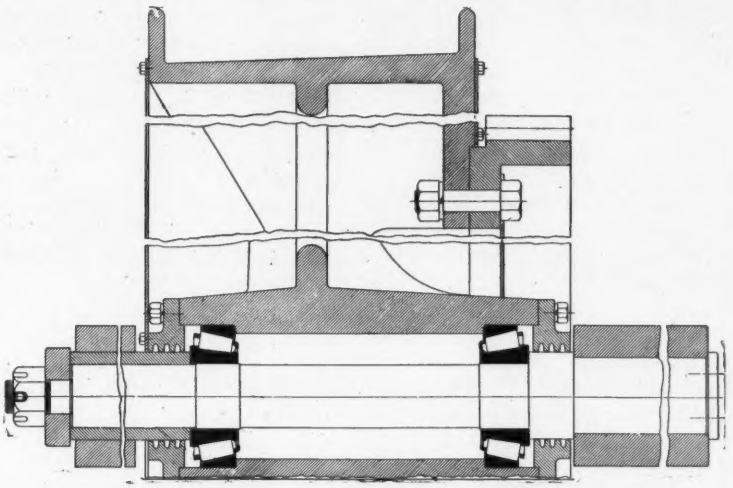

Fig. 9. Main Shaft of a Capstan, Showing Tapered Roller Bearings 2¼"

Wire Straighteners

In applying anti-friction bearings to wire straighteners, one of the principal advantages that has been gained is the increase in the rigidity with which the various shafts are held. This is particularly true in the case of the straightener arbor proper, where the matter of permanence of adjustment assumes great importance. Figure 10 shows the bearing mounting used for the arbor of an automatic rotary wire straightening machine. The mounting is not at all complicated, consisting of a single bearing on each end of the arbor. It is calculated, however, to render the alignment of the arbor permanent in character in spite of the high speeds, and the unbalanced load formed by the arbor. Other tapered roller bearing applications on this machine include the fly wheel shaft, and the intermediate drive shaft. The other mountings are of the conventional type that has already been covered.

The applications discussed above by no means comprise the complete story of what has been done in anti-frictionizing wire making equipment, but they have been selected as being most representative of their particular classes. The complete list would include numerous examples of accessory equipment, such as reels, gear drives for main roll mills, conveyors, electric motors, various types of handling equipment, and others

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Connected to World by Wire Only

Transportation Difficulties of Isolated Mountain Regions Solved by Cableway—Details of Wire Used

FROM earliest days the problem of transportation in the Andean regions of South America, with tremendous heights and distances from coast ports and almost-impossible terrain between, has taxed the skill of the best engineers. In Columbia, for instance, practically every known means of transportation is found, from crude balsa rafts to steam-, wood- and oil-burning stern wheelers and most recently, Diesel-engined boats, On land, horse, mule, bullock and Indians' backs are used. Railroads in course of development are, at best, but connections to points of river transportation, mountain ranges making real roads impossible. Airplanes are coming into wide use.

Another transportation system, the aerial cableway, fits well into the scheme for a mountainous country. For years, Caldas has been faced with the problem of connecting Manizales, the terminus of rail connection with a Pacific port, with its outlying coffee districts. In that exceptionally mountainous region usual railways or highways as a means of transportation were abandoned. It was necessary to devise a method that would keep cost and operating expenses within economic limits.

Investigation resulted in a decision that territory to north would be best served by a line from Manizales to Aguadas, and those to west by a line from Manizales to Pueblo Rico, 60 and 69 kilometers respectively. Stations were to be placed in all the towns along these routes. The construction of the lines from Manizales to Aguadas, known as the Cable del Norte, was undertaken by the Department of Caldas, while the line from Manizales to Pueblo Rico, known as the Cable del Choco, is being financed by the National Government. It is proposed to extend this line later to a Pacific port.

In laying out these lines it was essential that they meet at a point convenient for transshipping to the railroad. A station building was so located that both cableways could be accommodated. Road and railway tracks were then placed so as to require a minimum handling of cargo. It is of steel frame construction with total floor area of 7,802 sq. meters, of which 2,260 sq. meters will be used for warehouse purposes and the remainder for power plant, car handling, and repair shops. Both passenger and cargo cars within the station are handled on overhead rail and propelled by hand.

Electrical-driven Endless Steel Cable

This system consists of an endless moving cable supported throughout its length on steel sheaves which are carried on galvanized steel trestle towers. The power is transmitted from electric motors through belts and gears to a large driving drum around which the cable passes. The cable on the opposite end passes around a similar free turning drum carried on a movable steel frame, which is held in the right position to maintain a proper cable tension by concrete counterweights suspended from a heavy steel frame.

The cars or carriers, are attached to the cable by a saddle having a small projection which fits between the rope strands and so designed as to pass freely over the sheaves. The saddle is attached to a cast frame which has on the opposite side a pair of small pulley wheels. When entering a station the cable drops below the level of a shunt rail system which engages the pulleys and automatically disengages the car. Leaving a station, this process is reversed.

It was required that the installation be capable of transporting passengers and not less than 20 tons per hour of cargo in both directions, individual loads of 1 ton and live freight if necessary. In order to do this it was decided to use a steel cable of 6 strands, having 7 wires each, and a hemp core. The operating speed is 120 meters per min.

Stations About 4 Miles Apart

As the cableway was of considerable length it was necessary to divide it into a number of sections, each with a power and a tension unit. They have been so arranged that the stations, in every instance, are situated in cargo centers and provide for the necessary line deflection angles. This resulted in an average distance of six kilometers (3.7 miles) between stations.

After considerable study of various systems of motive power, it was decided to electrify the Manizales-Aguadas system "Cable Aero del Norte," which was first under construction. No cableway of this size or type had ever been operated electrically with the exception of short hauling systems in connection with mines and a few such as the Rio de Janeiro passenger cableway which is entirely different in design. Thus the engineers had no actual installations to study and no established practice for their guide. There is no maker of complete aerial cableways. The equipment which is always special, is ordered from a dozen manufacturers or more who may or may not have built pre-

(*Please turn to page 277*)

Abstracted from *The Digest*, Inter. Gen. Elec. Co.

WIRE DRAWING AND THE COLD WORKING OF STEEL

By Alastair T. Adam, A. R. T. C.

(Associate, Royal Technical College, Glasgow)

The only book of recent years dealing exclusively with the problems of cold working and wire drawing. Written by a leader in the field. 212 pages. Cloth bound boards, 7½x10 inches. Profusely illustrated from photographs. Indexed. Price: $13.00 a copy, carriage prepaid.

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V. Heat Treatment
VI Effect of Cold Work on the Physical Properties of Metals
VII. Effect of Cold Work on the Physical Properties of Metals (cont.)
VIII. The Effect of Heat Treatment After Cold Work
IX. Theories of Plastic Flow in Cold Worked Metals
X. The Pathological Aspect of Cold Working Operations
XI. The Application of Cold Work to Non-Ferrous Metals and Alloy Steels

British Wire Drawing and Wire Working Machinery

By H. Dunell, A. C. G. I., A. M. I. Mech. E., B. E.

(Editorial Staff, "The Engineer")

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VIII. Wire Netting Machinery
IX. Wire Factories
X. Wire Weaving Looms
XI. Electric Cable Making
XII. High Speed Stranding Machines
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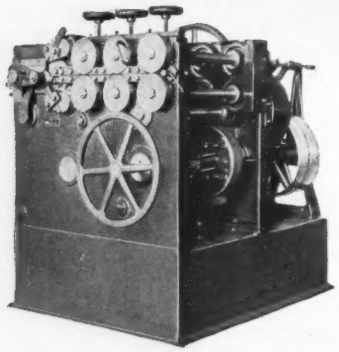
Universal Spring Coiling Machines



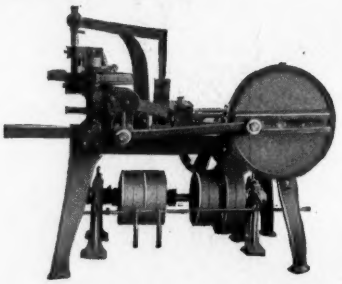
For the past decade our Universal Spring Coiling Machines have been the World's standard. As yet their speed of production and accuracy of work is unapproached by competition.

Built in 11 sizes, these machines handle cold, oil-tempered wire from .004″ to ⅝″ diameter. They make a wide variety of spring forms at high speeds, and will close the spring ends, doing away with expensive hot pressing.

In addition we are ready to supply at short notice Spring Setters which will care for any of the springs produced by the machines above. We also make a Spring Hooker in four sizes which forms loops and hooks, and is readily adjustable to take a wide range of wire sizes.

Torsion Spring Winding Machines

Our Torsion Spring Winding Machines are made in five sizes, having a range from No. 29 to ⅜″ wire. These machines will accommodate long lengths of wire, will leave one or both ends extending from the spring in any predetermined direction, and in some cases, is able to form these ends into crimps or hooks. Changes from one spring form to another with small tool charge.



Coiling Machines for Special Springs

In addition to our line of Standard spring coiling machines, we build a group of Special Spring Coiling Machines and also stand ready to construct on order added machines to do specialized work. We can supply Special Coilers to make fine helical forms in long lengths, for making choke and other small casings of various kinds, lamp necks, square and rectangular springs, resistance coils of alloy wires, and such fine coils as are used in electric light bulbs.

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PRODUCTION COSTS

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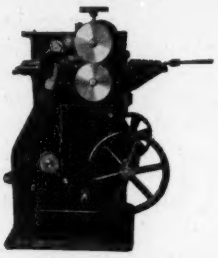
Upholstery Spring Coiling Machines

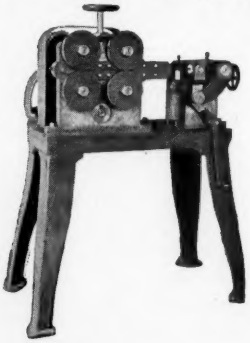
We have developed two high-production machines for the manufacture of the coil springs used in upholstery work. The first of these is the Furniture Spring Coiling Machine which handles a heavy grade of oil-tempered wire. The second is the Marshall Spring Coiling machine, producing the type of lighter spring so widely used in cushions and fine chairs. Both of these machines are without peers as to speed and accuracy of production, and both will make straight-side, cone, and hour-glass spring forms.



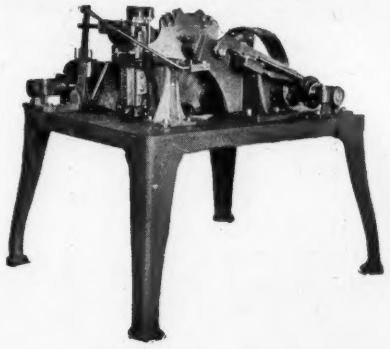
We also supply for these machines powerful, accurate and speedy Spring Setters and Knotters.

Helical Bed Spring Equipment

Meeting a special demand, this Helical Bed Spring Coiling Machine, when used in conjunction with the Helical Spring Cutting and Hooking Machine, is capable of producing daily 4000 pounds of springs, ready for hardening.



The product of a long period of experiment, this machine is widely known in the Trade as a rapid and powerful machine. It will coil No. 11 wire into a ¾" coil at 2500 turns a minute. This is the only machine on the market which will keep up with the production demands of Cutting & Hooking Machine described below.



This Cutter and Hooker will produce springs from 6 to 24 coils, taking any length of coil produced by the Coiler. It will allow for "crawl" in the spring during the baking process, and hooks may be set at right angles to each other. Each spring is accurately measured, the machine being noted for its extreme accuracy and reliability.

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Foreign Agents

UNITED KINGDOM—Mr. Fredk. A. Perry, 63 Queen Victoria St., London, E. C. 4

MONTREAL AND TORONTO—Arthur Jackson Machine Tool Co.

AUSTRALIA AND NEW ZEALAND—Edwin Wood Pty. Ltd., Melbourne

JAPAN—Andrews & George Co., Tokyo

No Rejects

Personalities and Gossip of the Show as Told by a Roving "Trouble Shooter"

THE convention smoke having cleared away, pleasant memories of what happened remain, to be told and retold by those who were there. What a place that was for meeting "Old Timers" we hadn't seen for years. If you listened you could hear, "Don't you remember when" over and over again. Vice Presidents of companies in the Pittsburgh district swapped reminiscences with fellow wire drawers with whom they grew up in New England. Mill owners from New England remembered when they considered Buffalo the jumping off place in a westerly direction. Many visitors to the convention had conflicting emotions about the city, some had come to Buffalo on their honeymoons, others liked it because Canada was so handy and still others just came to learn something.

Moredecai the absolute Czar of his section of Sparrows Point carefully surveyed the Exhibition and the Convention, attended by his Chief of Staff and entourage. Everywhere he went voices which had been loudly proclaiming that they knew this or that subsided into respectful quiet as this august personage passed or stopped near them.

Crown Prince Poole of Carpenter Steel Co., traveled incognito, attended only by his "men-in-waiting and listening", Messrs. Conway and Greenwald. This unobstructive trio moved quietly from group to group with careful unconcern. But when two or three were gathered together discussing stainless, there were they in the midst, funnel eared, saying nothing and playing dumb. If addressed by any who recognized them as to "how do you do it", you would have thought they had never heard the word stainless in connection with steel.

This same "trouble shooter" will give us similar dope each month on personalities in the industry.
Watch Out for this column.

Publicity has its place in every convention, even the best of conventions has to put up with some of it. Some of it we like and some of it is just too bad, but Kenneth Lewis did as neat a job as anyone could have wished for, in fact it was so darned good we wanted more. To look at him puffing on that chimney which must be a part of the fixed assets of his company, one would never suspect the very mischievous Peck's bad boy underneath. Nobody ever told me so, but I have watched him closely in repose and posing and both of my observations confirmed my original impression which was, "Here is a damned fine young man with brains trying to look older than he is to get business from us old fellows". Even Dawes got rid of his pipe, or at least it is seen without him these days. Anyway, if that was publicity, let us have more of it.

Everybody in the East, at least those who draw wire, knows Lawrence of the Ironsides Company. A very likeable fellow slightly inclined to the avoirdupois, a condition which is steadily improving. On being introduced to Paul Metzler of the Bliss and Laughlin Co., Buffalo, a gentleman of the same type but cast of a slightly larger mold, Lawrence in his snappy quick way, retaliated with, "Say, Paul, let's get our heads together." They tried it and succeeded only by standing back to back. This happened in the lobby of the Statier, while staid Buffaloians gaped open eyed at the wonder of it.

Who would ever have thought that Jacobs of Central Alloy Steel Company was born in France, not many miles from gay Paris? Down where he comes from I'll bet they don't know about it. If you asked me, I would say he was more typically American than any product of the Pittsburgh district. He must have enrolled in the steel industry at birth, for he knows everybody of any account and anybody of any account knows him and worked with him at some time or other.

When I saw Clark Judd, Bassett, Yeates and Lockwood of American Brass Company strolling down the aisles of the Exhibition followed by several others I did not recognize, I said to myself, "Those boys are awake and don't miss a thing". A Steel and Iron convention and yet the brains of the Copper and Brass industry on hand to study whatever progress they saw. There is a lesson for all of us packed in that little news item.

Over in one corner of the convention hall was packed six enterprising exhibitions. All of them had bearing directly on the wire industry and bore relation to each other as did no other booths in the show. It was gratifying to see two machine manufacturers operate in harmony at such proximity. But the beauty of this set up was the fact that Morris Simons had his Union Wire Die booth in such a position as to be useful to both, be near the booth of his magazine, see everybody who came to the show, whether they wanted to see him or not.

What a guy that bird is. It was more or less a holiday for everyone else but not for him. He would sell dies for spectacle holders provided they could be used for the purpose and the public would pay the price.

Out in Beaver Falls there must be a law against music, otherwise why would a man like Leech of Union Drawn Steel spend all of every evening almost glued to the automatic phonograph in the lobby of the Statler. The music didn't come on until nine thirty five, but he would grab himself a chair about seven so as to be sure to have one right alongside of it when they turned on the juice. He had one young chap scout around for half an hour imploring the manager to have the music started a little early. This same hilarious personage found a note to call Beaver Falls in his mail box. Good husband that he is he called his wife and found that someone else in Beaver Falls had sent the message. She was pleased he had called but was sure he must be sick or something. Figure that out.

Definite inquiry would easily establish who was on the sixteenth floor of the Statler, but who cares? Those who missed the nightly gatherings of the Wire Drawers Choral Society will never know how sweet Sweet Adeline can be on liquor finished music wire, nor what a note of satisfaction can come from a condenser tube playing O Sole Mio.

Charley Kempert of the American Works of the American Steel and Wire Co., overplayed his hand at remaining obscure. Once or twice salesmen zealous for his consideration drove him in desperation to the ranks of the visitors from the brass industry and the consternation of the Big Boy was painfully obvious. A grandfather need not be frightened by a little thing like brass.

Revised British Specification For Copper Wire

A revision of specification No. 128, Copper Wire for Electrical Machinery, has just been issued by the British Engineering Standards Association. It is intended to meet the needs of users of bare, annealed, high-conductivity copper wire for winding electrical machinery and apparatus. One of the principal differences between the new and the 1922 editions is that the tolerances permitted on the resistivity of the copper and on the diameter of the wire are smaller in the new publication. Furthermore, the tables of sizes and resistances of wire have been entirely rearranged and remodeled.

Connected to the World by Wire Only

(*Continued from page 272*)

vious equipment. One concern supplies sheaves, another the steel arrangement that carries the sheaves. The hangers, the tension station equipment, the driving station and the power plant are furnished as separate lots and come from an equal number of concerns.

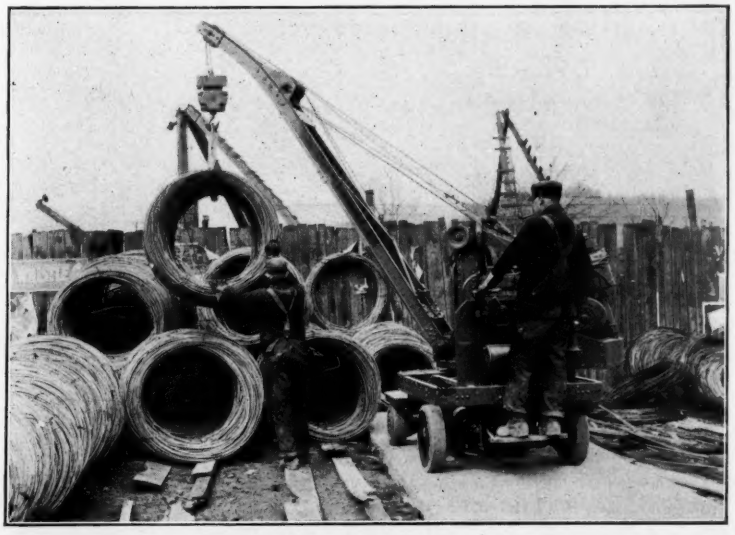
There are six motor-operated stations on the Norte system in each of which a 100 hp. variable-speed General Electric motor drives the cable drum. Three single-phase transformers step down the transmitted voltage from 11,340 to 220. An 80-hp. Diesel engine is installed in each station as a standby. Power is brought to these stations from a hydro-electric plant erected for the purpose on the Guacaica River 500 kilometers from Manizales, directly in line with the right of way of the system.

For transmission of power to the various stations it was decided to construct a separate line rather than attempt to carry the circuit on the towers. The transmission line consists of 4 conductors of No. 6 B. & S. aluminum, steel reenforced cable, or 240 kilometers in all. The fourth wire is an emergency line and through a switching arrangement can be impressed into service in any or all sections over the entire system in case of failure of one of the other conductors or line insulator trouble. The line is carried on 600 steel poles, using 2,400 pin type insulators.

High Bay Lighting Correction

The installation showing the lighting in a wire mill, as presented by Mr. Warren on page 213, June issue, notably the caption of Fig. 5, is of the prismatic high bay type, manufactured by the Holophane Co.

J. E. Conroy has been appointed sales manager of the Tremont Nail Co., Wareham, Mass. Mr. Conroy was associated with the Standard Horseshoe Co., South Wareham, Mass.



The Self-propelled Industrial Truck with Crane Attachment Finds Many Uses Around the Wire Mill. Courtesy Baker Raulang Co., Cleveland, O.

NEWS *of the* INDUSTRY

Foreign Trade Opportunities reported by the Bureau of Foreign and Domestic Commerce during the month of June include inquiries from the following sources: Looms for insulation (45495) Regina, Canada; electric wiring supplies (45559) Rosario, Argentina; baling and fencing wire and wire netting (45602) Hastings, N. Z.; wire netting (45540) Lisbon, Portugal; electric wire pole line equipment (45525) Regina, Canada; insulating material (45538) Hamburg, Germany; cotton twine and rope (45549) Vancouver, Canada; insulated cables and wires (45658) Barranquilla, Columbia; cordage making machinery (45710) Bordeux, France; wire weaving equipment (45711) Heidelberg, Germany; copper wire bars (45750) Milan, Italy; belt buckles (45703) Singapore, Straits Settlements; varnished insulating fabrics and nickel chrome resistance wire (45769) Milan, Italy; insulating materials (45781) Milan, Italy.

Railroad Standardizes Fencing

The London & North Eastern Railroad, one of the four big railroad systems of the United Kingdom, has just announced its intention of adopting standardized wire fences throughout the whole of its system. About 12,000 miles of fencing is involved by this decision, and when the old fencing requires renewal the new standard wire fence will be erected. This will greatly enhance the appearance of the undertaking's extensive properties.

Brazilian Barbed-Wire Imports Fall

Official Brazilian statistics show that imports of barbed wire into Brazil in 1929 amounted to 38,958 metric tons valued at $2,703,785, as compared with 47,655 metric tons valued at $3,355,570 in 1928—a decrease of 18 per cent in quantity and 20 per cent in value. It is understood from importers located in Rio de Janeiro that Belgium is the chief factor in this trade, and that the United States supplies about one-third to two-fiifths of the total importation. Figures for the first 11 months of 1929 show that receipts from the United States totaled 23,912,901 pounds valued at $639,218, against 33,-318,336 pounds valued at $967,-442 for same period of 1928.

Imports of wire other than barbed wire were larger in 1929—by 10 per cent in quantity and 11 per cent in value. Official statistics show that in 1929 38,818 metric tons of wire valued at $2,507,963 were imported, against 35,204 tons valued at $2,260,369 in 1928. The participation of the United States in this trade is stated to amount to only about 5 per cent of the total, with the greater part of the supply originating in Germany and Belgium. (Consul George E. Seltzer, Rio de Janeiro.)

Japan Exporting Copper Wire To Europe

Current statistics show that the present price of copper has greatly encouraged production, and only a few months ago the British market was confronted with some thousands of tons of Japanese brands in the form of cathodes, wire bars, and ingot bars, which were offered well below the exporters' official price. Consumers purchased very little, but a few hundred tons were secured by English merchants, who were able to dispose of it to manufacturers at a profit, although it is so long since foundries in the United Kingdom used copper from Japan that they found some little difficulty in disposing of all the metal.

Undoubtedly Japan finds copper producing a very favorable proposition at the present price, and should the 18 per cent level be maintained the American combine may be compelled to relieve the market of surplus tonnage during 1930. Apparently surplus copper production in the Orient is not limited to virgin material, for there is evidence that wire is now being exported to Europe at a figure below that quoted by the European wire-drawers, who are, of course, almost entirely dependent upon the combine for their supplies of raw material.

Expiry of German Cartel Reason For Lack of European Cartel

According to the latest information, the main reason why it has not yet been possible to establish a Continental wire cartel appears to be that the German cartel expires at the end of 1930. The Belgian and French wire manufacturers are naturally not interested in coming to an arrangement that might fall through in about six months. Negotiations have been started with a view to the extension of the German cartel, but no decision seems likely to be arrived at before the end of June. Customers are aware of the position and are getting the lowest possible prices from the manufacturers. Galvanized wire has recently been selling as low as £7 17s. 6d. ($39.35), bright wire at £6 8s. ($32.00), barbed wire at £10 7s. ($41.75), and wire nails on a basis of £6 8s. 6. ($32.10).

Changes in the German Wire Mesh Industry

The oldest wire mesh industry is the German. Thüringen is the main producing district, where the industry goes back to the 16th century. The number of manufacturers in Thüringen

at present is 26. 70% of the production is being sold for export. There is no branch of the German wire industry, in which the influence of American methods recently has been so important, so that a revolution of the producing methods took place. The German wire mesh machine for producing woven mesh which was generally in use up to 1926/28 was working faster than the American machine. It was weaving 90 wires per minute compared with 50 of the ordinary American machine. However the American machines had been working much quieter and steadier and were lighter, the German machines very extremely heavy (up to 35 tons), could therefore be established only on the ground floor as the vibration of these machines was very heavy. The American machines had been operating much smoother and with far less repairs to tools and spindles, so that only 8-10% of the working time had been lost with installation of new spindles and repairs; up to 30% of the working time was lost with the older German machines. Therefore a German workman could handle only 2-3 machines, whereas the American workman could easily handle 6-8 weaving machines, which were formed in a circle round the workman. Besides this it was impossible to produce the hard American wire mesh on the German machines, only soft wire mesh. Certain markets, as for instance Canada, the whole of the Far East, South Africa, etc., favored the hard American mesh after the war, so that the German wire mesh factories were losing business. The consequence was that American machines had been imported. At first a Westfalian maker (Carl Haver & Ed. Boelke of Oelde i. W.) bought American machines and produced the American mesh with their specially-patented new enamelling process. Other makers were following, when the German machinery industry constructed also a new type of machinery which was quickly adopted by the German mesh industry (Machinery works E. Jäger of Neustadt/Orla and F. Irmischer Saalfeld, both makers of wire mesh machinery). The wire mesh machines of Jäger are said to be an improvement on the American machines and the Company has already secured considerable export orders from European and Overseas, amongst which also Canadian wire mesh manufacturers. The machines are electrically driven, floor space is 15% less than the same American, the weight is a little lighter and the renewals of spindles and repairs are guaranteed not to exceed 6-7% of the working time. One workman can serve 7 such machines. The machines make 110 wires per minute of 1 m. broad mesh. The new machines can produce both soft and hard mesh. The company sells also a new type of lacquering oven which works automatically. In the ovens the wire mesh is varnished, dried and cut to lengths automatically with a capacity of 1,000 meters per day in each oven. Gas, electricity or steam can be employed with little change in the system.

The position of the German wire mesh industry has improved since the use of these new machines, although prices are depressed; the small percentage of mesh sold on the domestic market at higher prices cannot compensate for the low prices on the world markets. Certain markets, as for instance British India, East and West Africa, etc. now buy almost 100% of their total imports from the Thuringian wire mesh industry.

COMING EVENTS

Aug. 24-29. 3rd International Congress of Applied Mechanics, Royal Technical Inst., Stockholm, Sweden. Information from Sec'y., Amer. Soc. Mech. Engs., 29 West 39th St., New York, N. Y.

Sept. 9-12. Annual Autumn Meeting, Inst. of Metals, South Western Hotel, Southampton, England. Sec'y., G. Shaw Scott, 36 Victoria St., London, S W 1.

Sept. 14-21. Engineering and Chemical sessions, International Exposition, Liege, Belgium.

Sept. 22-26. Annual Convention, Amer. Soc. for Steel Treating, Stevens Hotel, Chicago, Ill. Sec'y., W. H. Eiseman, 7016 Euclid Ave., Cleveland, O.

Sept. 22-26. 12th Annual National Metal Exposition, under auspices Amer. Soc. for Steel Treating, Stevens Hotel, Chicago. Sec'y. as above.

Sept. 22-28. National Metal Congress, Stevens Hotel, Chicago, in conjunction with Amer. Soc. for Steel Treating annual convention, Metals and Iron & Steel Divisions, Amer. Inst. Mining & Metallurgical Engs., annual Fall meetings, Machine Shop Practice Division, Amer. Soc. Mech. Engs., and Amer. Welding Society.

Oct. 1-11. 6th International Exhibition of Inventions, Central Hall, Westminster, S W, London. Sec'y., G. Drury Coleman, 39 Victoria St., Westminster, London, S W 1.

Dec. 1-6. 51st Annual Meeting, Amer. Soc. Mech. Engs., Engineering Societies Bldg., West 39th St., New York. Sec'y., Calvin W. Rice.

Obituary Notices

Carl Marquardt, 93, founder of Milwaukee Woven Wire Works, Milwaukee, now the Marquardt Co., and for 20 years its president, died May 1. He was born in Germany and located in Milwaukee in 1866. He retired about two years ago when Reinhold W. Marquardt became president and general manager.

—

Roswell A. Moore, secretary-treasurer of the Waterbury Buckle Co., died in Paris on Tuesday, June 3rd. He had been traveling through Europe, and was stricken with pneumonia May 16th. He received his early manufacturing training in New Britain with the Treat & Hine Co., which manufactured brass goods and novelties. Some time later he established a manufacturing business in Kensington which prospered until his factory burned in 1906. Soon after he moved to Waterbury, affiliating with Waterbury Buckle Co.

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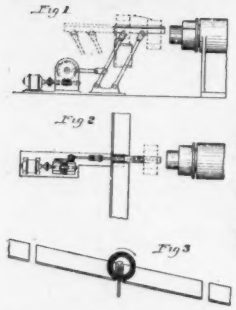
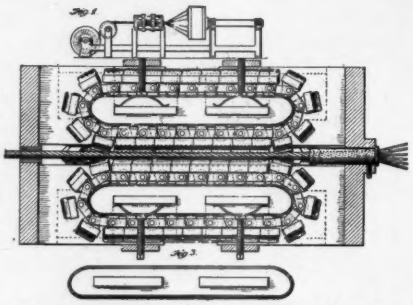
Arthur Schaeffer has been appointed sales manager of the Detroit district for the Republic Steel Corp. He formerly was sales manager in Detroit for the Central Alloy Steel Corp.

A REVIEW *of* RECENT PATENTS



Complete descriptions and drawings of patents may be had for 25 cents. Address, Wire & Wire Products, 551 Fifth Avenue, New York.

At Left: Johnson's Apparatus for Transferring Coils of Wire, 1,757,772.



At Right: Evans' Die for Laying Wire Rope and Wire Rope Strands, 1,759,105.

No. 1,756,972, WIRE STRAND. Patented May 6, 1930. Edward A. Conner, Stratford, Conn., assignor to American Chain Co., Inc., a Corporation of N. Y. The primary object of this invention is to provide a wire strand composed of several wires twisted together in helical relation and formed by swaging to present a cross-section of steam-like contour, thereby to tend to diminish the air-resistance of an aeroplane stay thus constituted.

No. 1,756,973, THREADED WIRE STRAND. Patented May 6, 1930. Edward A. Conner, Stratford, Conn., assignor to American Chain Co., Inc., a Corporation of N. Y. This wire strand is composed of several wires twisted or laid together, with a thread formed upon a portion of their periphery by swaging, to adapt the wire strand for connection with an attachment member such as a shackle having a socket threaded internally to receive the threaded portion of the wire strand.

No. 1,757,030, ELECTRIC CABLE. Patented May 6, 1930. John Francis Watson, Abbey Wood, Philip Vassar Hunter, Lonson, and Alfred Edgar Wilson, Bromley, England. The wire conductor is so constructed that its diameter may be reduced, after the cable is made up, sufficiently to give the desired freedom of axial and radial movement between it and the di-electric. Thus, instead of forming the passage initially, as in the inventors' prior U. S. Patent No. 1,743,506, of Jan. 14, 1930, it is produced by a reduction of the diameter of the wire conductor.

No. 1,757,049, ARMORED ELECTRIC CABLE. Patented May 6, 1930. Gustave A. Johnson, Irvington, N. J., assignor to American Metal Molding Co., a Corporation of N. J. The wire conductors of this armored cable have a primary insulating sheath of rubber, then a number of paper wrappings spirally wound over the sheath in such manner that the convolutions of one wrapping lie crosswise relative to the convolutions of an underlying wrapping, the wrappings being bonded together and to the rubber sheath by intermediate layers of a non-drying and non-hardening tacky substance.

No. 1,757,156, FLEXIBLE WIRE ROPE. Patented May 6, 1930. Oscar A. Wirkkala, Glendale, Ore. Particularly adapted for use in logging operations, this wire rope comprises a wire cable consisting of a core, an innermost lay about such core composed of eight strands each made up of three wires, an intermediate lay about this innermost lay, composed of eight strands, each made up of seven wires, and an exterior lay composed of eight strands of nineteen wires, the wire composing each of the strands being twisted together in the same direction, and the twist of the strands composing the lays being twisted in the opposite direction to that of the wires composing the strands. The diameters of the wires composing the strand are relatively increased from the interior lay to the exterior lay, in the ratio of 7, 9 and 11 approximately.

No. 1,757,489, METHOD OF TREATING WIRE FABRIC. Patented May 6, 1930. Ferdinand Steinhart, Cleveland, O., assignor, by mense assignments, to the Lindsay Wire Weaving Co., of Cleveland, O., a corporation of O. The process of forming loops in the edge of woven wire fabric belts, particularly those which are adapted for use in connection with the operation of fourdrinier paper-making machines, comprises progressively inclining one row of thread ends laterally in the same direction, then progressively inclining another row of thread ends in the opposite direction to cross the ends of adjacent warp wires, and then progressively applying heat along the edge to weld the warp ends together to form loops.

No. 1,757,717, INSULATED CONDUCTOR AND METHOD OF MANUFACTURING THE SAME. Patented May 6, 1930. John Johnston, New Haven, Conn., assignor to Western Electric Co., Inc., of New York, N. Y., a Corporation of N. Y. In order to increase the resistance to water penetration of rubber insulated fire conductors, the inventor fashions rubber to form a layer about the central wire conductor, heats the conductor under a vacuum to drive out moisture, from the pores throughout the depth of the layer of rubber, and fills the pores to a comparatively small depth below the outer surface of the rubber layer with water resistant material, such as paraffin.

No. 1,757,772, APPARATUS FOR TRANSFERRING COILED MATERIAL. Patented May 6, 1930. Lane Johnson, Ingram, Pa., assignor to United Engineering Foundry Co., Pittsburgh, Pa., a Corporation of Pa. The inventor provides a device adapted to receive the coils as they are ejected from the reel and automatically deposits them on the conveyor. He employs an arm movable from a coil-receiving position to a discharge position and so moves the arm that it has a downward component of movement adjacent the discharge position. A stripper is provided so that when the discharge position is reached the movement of the coil with the arm is stopped and continued movement of the arm is effective for stripping the coil.

No. 1,758,420, METHOD OF PRODUCING A COATING STABLE TOWARD ACIDS AND ALKALIS ON METALLIC ARTICLES. Patented May 13, 1930. Fritz Ahrens, Bockenem-on-the-Harz, Germany, assignor of one-half to Harzer Achsenwerke, G. M. B. H., Bornum-on-the-Harz, of Konigsdablum (Post Bornum-on-the-Harz), Germany, a Firm. A method in this invention consists in first coating the metal with a solution of cacutchouc containing acid substances (a reaction product produced by sulphurizing oxidizable oils by means of sulphur chloride), applying a layer of coautchouc to such coating, and vulcanizing the same.

No. 1,759,105, DIE FOR LAYING WIRE ROPE AND WIRE ROPE STRANDS. Patented May 20, 1930. Joseph E. Evans, Bedford, Ind., assignor of one-fourth to Charles S. Knight, Chicago, Ill. The object of this invention is to provide a wire-laying multiple-element die which shall exert a strongly compressive action on the groups of wires passing through the device and being formed into a finished cable element for a considerably greater extent of the path travel of the cable than is usual in the case of dies ordinarily employed in wire rope making machines.

Clarifying the Wire Cable Question, III

Influence of Cable Loads—Greater Satisfaction from Thicker Wires (American Practice) for Elevator Service

*By R. Woernle, Stuttgart**

WHAT is the best roll ratio in relation to the wire thickness, using a geometrically-similar cross section but cables of different diameters? This question is partly answered by the experimental work plotted in Figs. 28-29. In these it is shown that the duration of life, as indicated by the thousands of reversals of stress in the tests, does not follow an increase in tensile strength of the wires, altho cables with steel of increasing strength are to be considered favorably. The cables with ex-

*Chairman, V. D. I. Wire Rope Committee. From *Zeitschrift des Vereins Deutcher Ingenieure.* Translated by W. H. Fulweiler, United Gas Improvement Co., Philadelphia.

In the first installment, April, general problems in connection with industrial uses of wire cables were outlined as well as the plan followed in testing groups of cross- and direct-wound cables. Diameter of groove base and influence of winding were considered.

In the second part, May, the testing followed through to determine the limitations with the smallest groove base radius. In all these experiments the direct wound cable showed superiority. Next the influence of the thickness of the wires and the number upon the life of cables was investigated. Method of winding was found significant.

In the present third installment, the relation of roll ratio to wire thickness using different diameters but similar cross sections, is considered. Also, relations between stress and decreased carrying power.

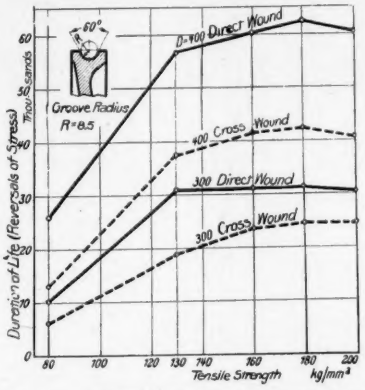


Fig. 28. Influence of Tensile Strength on Length of Life with Similar Specific Loads.

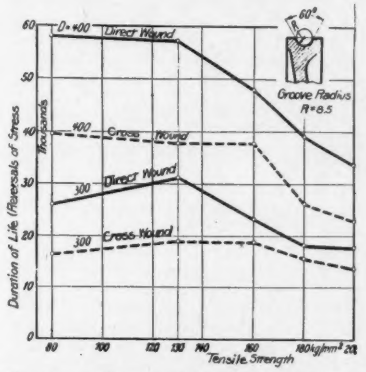


Fig. 29. Influence of Tensile Strength on Life at Equal Security of Pull.

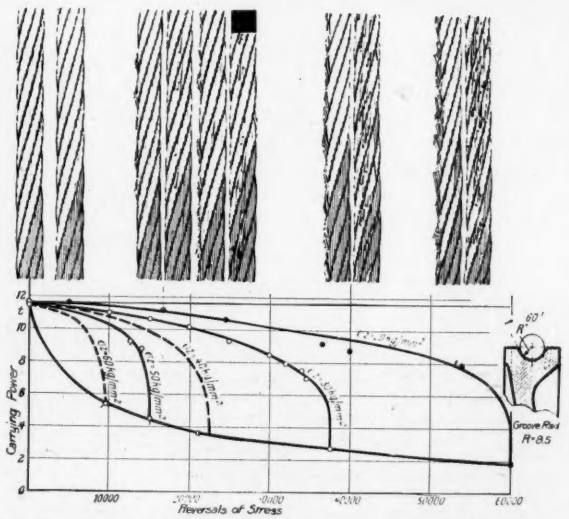


Fig. 30. Relation between Number of Reversals of Stress and Decrease in Carrying Power of Cross-wound Cables.

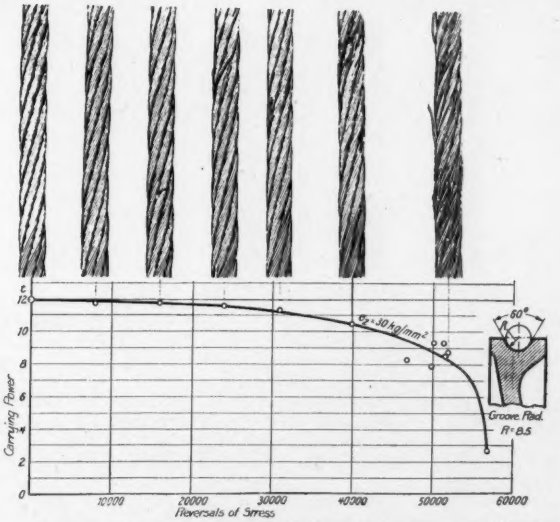


Fig. 31. Relation of Reversals of Stress and Decreased Carrying Power for Direct-wound Cables.

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FLUX IN POCKETS
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Ready to Use
Needs only Heat
EXACT
No more soldering failures—Kester eliminates the guesswork of separate fluxes. Its simple, sure operation will speed your soldering efficiency. Profit by using Kester Flux-Core Solders in your industrial soldering processes.
Let our experts analyze your work and increase your specific needs and recommend a special solder, designed for your particular purposes. Consultation imposes no obligation; write our research department today.
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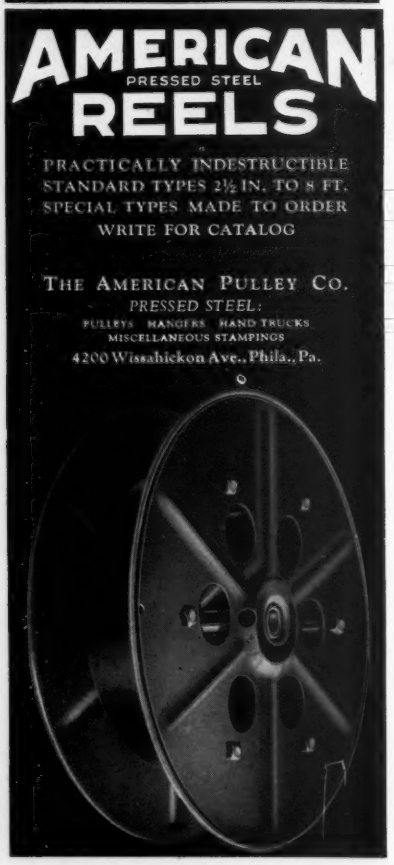
Incorporated 1899.
Formerly Chicago Solder Co.
KESTER
FLUX-CORE
SOLDER
ACID-CORE
ROSIN-CORE
PASTE-CORE
METAL MENDER
RADIO SOLDER



ceptionally strong wire were shown to be not so favorable as compared with those of 130 kilograms per square millimeter strength. Note in Fig. 28 that the peak of these curves comes at this modest strength value.

Figure 29 shows the same effect, length of life decreasing with increase of tensile strength. Cables with wires of 130 kg/mm² tensile strength are shown to be favorable, as in the previous experiments plotted in Fig. 28.

loses its original security in the course of its work. Figure 30 shows the relationship between the number of reversals of stress and the carrying power of a cross-wound cable, and indeed for various specific cable loads.

The cables were taken apart after a determined number of reversals of stress, in order to determine the remaining carrying power, i. e., the decrease of the carrying power.

For the curve Kz=20

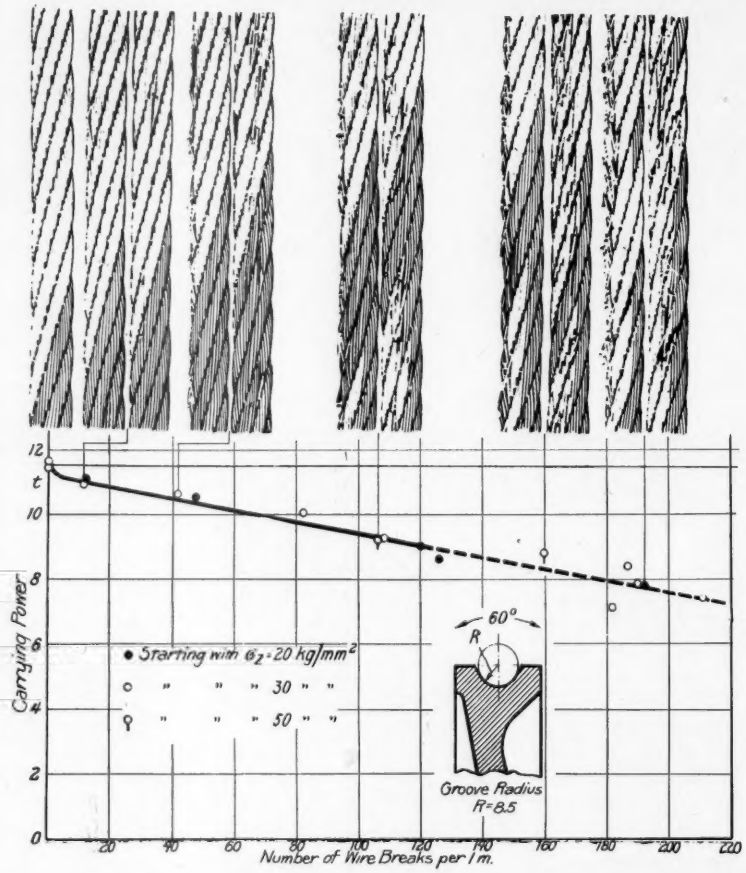


Fig. 32. Relation between Number of Breaks on the Wires and Carrying Capacity of the Cables (cross-wound cables).

The relationship between the number of reversals of stress and the decrease in carrying power of the cable is shown in Figs. 30 and 31; the relationship for cross-wound cables in Fig. 30 and the same relationship for direct-wound cables in Fig. 31.

The cable is an organ that

kg/mm., Fig. 30 shows in a series of experimental points the state of disturbance seen from the front and the side. Figure 31 shows the corresponding experimental curve for a direct-wound cable.

The comparison between the two curves for direct and cross-wound cables determines the

fact that the decrease of carrying power in a direct-wound cable takes place appreciably slower than in the corresponding cross wound cable.

The relationship between the number of breaks of wires and the carrying power of the cables for cross-wound cables is shown in Fig. 32. This relationship showed a practically linear course for the decrease in carrying power. A specific number of breaks in the wires corresponding to a specific decrease in carrying power.

It is to be hoped that in the future, by means of such diagrams, cables can be removed at the right time—not too soon and not too late.

Further experiments are proposed.

(*Concluded in August issue*)

Wire Day and Show, Big Successes

(*Continued from page 264*)

Electric Mfg. & Repair Co., 902-8 Chateau St., Pittsburgh, Pa.—H. L. Irwin.

General Cable Corp., Rome, N. Y. —Paul M. Mueller, Consulting M. E. Process & Equipment.

General Electric Co., Schenectady, N. Y.—E. G. Gilson, Research Engineer; J. A. Seede, Asst. to Vice-Pres.; Harry A. Winne, Industrial Eng. Dept.

General Elec. Supply Corp., Pittsburgh, Pa.—W. L. Fader, Division Sales Mgr.

General Forge Products Co., Shanghai, China—T. K. Sendzimir, Br. % Wonham, Inc., Mgr. 44 Whitehall St., New York, N. Y.

General Plate Co., Attleboro, Mass. —Mr. Willard, Mill Manager.

Gilbert & Bennett Mfg. Co., Georgetown, Conn. — Wilfred A. Hughes, Wire Expert, Gen. Foreman.

Globe Wire Co., Sharpsburg, Pa.— E. C. Mehringer, Wire Mill Supt.

Globe Wire Die Co., 30 Park Place, New York, N. Y.—Fred Vollmer, Vice-Pres. & Gen. Mgr.

Graham Nail & Wire Products, Toronto, Ontario, Can.—H. J. Quibel, Superintendent; E. A. Smith, Manager.

B. Greening Wire Co., Ltd., Hamilton, Ontario, Can.—F. H. Rutherford, Superintendent.

Grasselli Chemical Co., Inc., Cleveland, O.—T. C. Beninghof, Sales Engineer.

Gulf States Steel Co., Alabama City, Ala.—F. R. Thompson, Works Manager.

Hayward Co., R. B., Chicago, Ill.— R. B. Hayward, President; J. M. Wakefield, Eastern Sales Mgr.; H. B. White, Adv. Mgr.

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Experience

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Any manufacturer may make a good Diamond Die—but when you entrust your work to a Premier Diamond Die you are trusting it to Experience. As wire drawers for over 30 years we know your problems—we have worked out these problems for ourselves and Premier Diamond Dies are the Better Dies made for your individual needs.

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Hubbard Spool Co.
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Hewett Gutta Percha Rubber Co., 240 Kensington Ave., Buffalo, N. Y.—Geo. J. Guir; T. C. Zinte, Pur. Agent.

Holcomb Steel Company, 205 Conklin St., Syracuse, N. Y.—Alex J. Kennedy, Asst. Superintendent. 1012 W. Calvin St., Syracuse, N. Y.—Lawrence Thompson, Wire Mill Foreman.

Homestead Valve Mfg. Co., Coraopolis, Pa.—A. J. Pugh, Sales Dept.

Horton Angle Co., Attleboro, Mass.

E. F. Houghton & Co., 240 W. Somerset St., Philadelphia, Pa.—W. J. Wright, Lubricating Engineer.

Humphrey & Sons, Joliet, Ill.—W. J. Robinson, Superintendent.

Indiana Steel & Wire Co., Muncie, Ind.—Fred M. Crapo, Vice-Pres. in Chg. of Mfg.

International Nickel Co., Huntington, W. Va.—J. C. Lenhart, Supt.

International Railway Co., Buffalo, N. Y.—W. B. Hambly, Gen. Foreman of Power.

Interstate Iron & Steel Co., Chicago,, Ill.—W. C. Stone, Mill Mgr. Grand Crossing Plant.

Irmischer, M. A., 30 Church St., New York, N. Y.—Hubert Kolip, Consulting Engineer.

Jones & Laughlin Steel Co., Pittsburgh, Pa.—Alex Milne, Metallurgical Engineer. Alaquippa, Pa.—Roland M. Hussey, Supt., Wire Mill.

Kester Solder Company, 4201 Wrightwood Ave., Chicago, Ill.—C. O. Witherell, Engineer.

Keystone Mach. & Eng. Co., Sharon, Pa.—C. W. Holmquist, Vice President.

Keystone Steel & Wire Co., Peoria, Ill.—D. P. Sommer. Sec'y., Gen. Supt.

Krause, R., 32 Melrose Ave., Lynbrook. N. Y.

Laidlaw Wire Co., W. A., Peoria, Ill.—S. C. Sommer, President.

Latrobe Elec. Steel Co., Latrobe, Pa.—M. W. Saxman, Jr., Secretary.

Leach & Garner Co., Attleboro, Mass.

Ludlum Steel Co., Dunkirk, N. Y. —J. K. Findley, Service, Stainless Wire; E. Highly, Supt. Cold Drawn; Arthur H. Hanks, Final Inspection; Wm. P. Schnabel, Wire Mill Foreman. Watervliet, N. Y.—Mr. Weaver.

Lumen Bearing Co., Buffalo, N. Y. —K. B. Patch, Sales Mgr.

MacWhyte Company, Kenosha, Wisc.—H. G. Kinder, Plant Engineer. Kenosha, Wisc.—H. F. Parker, Supt. Rope Mill.

Madison Wire Co , Buffalo, N. Y.—A. G. Madison, Sr., President; A. G. Madison, Jr.

Manganese Steel Forge Co., Richmond St. & Erie Ave., Philadelphia, Pa.—L. W. Jones, Jr., Vice Pres't.

Maze Company, W. H., Peru, Ind. —John E. Donacall, Factory Manager.

Metal Textile Co., Orange, N. J. —Mr. Meyers, Mill Supt.

Micro Products Co., Peoria, Ill.—S. C. Sommer, President.

Miller Co., Cleveland, O.—John Cornish, Ivanhoe Division.

Milwaukee Elec. Crane Co., 6000 Greenfield Ave., Milwaukee, Wisc.—H. P. O'Neill, Service Engineer.

Minneapolis Honeywell Regulator Co., Minneapolis, Minn.—R. L. Costzenberger, Sales Engineer.

Minnesota Steel Co., Duluth, Minn. —P. R. Carmey, Electrical Engineer; J. A. Robinson, Supt. Wire Mills.

Morgan Construction Co., Worcester, Mass.—P. A. Beaman, Sales Engineer; Kenneth B. Lewis.

National Elec. Products Co., Ambridge, Pa.—Bob McWhinney.

National Machy. Co., Tiffin, O.—R. H. Jones, Sales Department.

Newark Wire Cloth Co., Newark, N. J.—L. C. Campbell, Secretary.

New England Butt. Co., Providence, R. I.—W. A. Richards, Sales Engr.

Page Steel & Wire Co., Monessen, Pa.—John D. Geiser, Plant Engineef. W. T. Kyle.

Jas. Pender & Co., Ltd., St. John, N. B., Can.—W. F. Knoll, General Superintendent.

Pennsylvania Lubricating Co., Pittsburgh, Pa.—Maurice Resnick, Mechanical Engineer.

Phillips Wire Co., Pawtucket, R. I. —Stanley Watson, General Manager.

Pittsburgh Steel Co., Monessen, Pa. —John J. Briening, Wire Mill Supt.; F. S. Simmons, Mgr. of Research

Pittsburgh Steel Co., Pittsburgh, Pa.—Norman F. Melville, Sales Eng.

Geo. W. Prentiss & Co., Holyoke, Mass.—Earle H. Thomas, Supt.

Pressed Metal Institute, Buffalo, N. Y.—Malcolm Baird, Secretary-Treas.

Reliance Mfg. Co., Massillon, O.—Wm. J. Heinauer.

Reliance Elec. & Eng'g. Co., Ivanhoe Road, Cleveland, O.—

Republic Flow Meters Co., 2240 Diversey Ave., Chicago, Ill.—Geo. D. Conlee, Production Engineer.

Republic Steel Corp. Canton, O.—E. P. Jacob Supt. Heat Treating & Cold Drawing, Central Alloy Steel Div., Chicago, Ill.—W. C. Stone, Manager Grand X Plants.

P. L. Robertson Mfg. Co., Milton, Ontario, Can.—P. L. Robertson, Pres.

Rome Wire Company, Buffalo, N. Y.—C. A. Somerside, Manager, Diamond Branch. Rome, N. Y.—S. A. Thomas.

Seneca Steel & Wire Co., Fostoria, O.—L. E. Kinn, President.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.—F. E. Meeks, Sales Eng. Dept.

Simonds Saw & Steel Co., Lockport, N. Y.—Edward W. Gilbert, Power House Operator; O. D. Glenn, E. E., Annealing Furnace Opr.

Sleeper & Hartley, Inc., Worcester, Mass.— W. H. Blount, Sales Engineer; G. D. Hartley, General Manager; Henry Nigro, Expert.

Steel Co. of Canada, Hamilton, Ontario, Can.—R. H. Peene, Engineer; R. Robertson, Supt. West Mill.

Technical High School, Eagle St. & Bennett Pk., Kenmore, N. Y.—Homer C. Brooks, Ch. E., Science, Dept. Instructor.

Thompson Wire Co., Worcester, Mass.—C. S. Arms, Manager.

Torrington Mfg. Co., Torrington, Conn.Robert S. Storrs. Vice-Prest.

Union Drawn Steel Co., Beaver Falls, Pa.—J. T. Leach, Chief of Tests.

Union Plate & Wire Co , Attleboro, Mass.—Wm. Apps, Tool Maker; Geo. Fipe.

Union Wire Die Corp., 333 West 52nd St., New York, N. Y.—Herbert B. Clark, Sales Department; M. Simons, President.

United Eng. Co., Pittsburgh, Pa.—M. J. Abbott, Eng. Dept.

United States Aluminum Co., 2050 Elmwood Ave., Buffalo, N. Y.—Chas. F. Gusewite, Plant Metallurgist; John S. Burdick, Chief Engineer.

United States Army, Signal, Sec. N. Y. Gen. Depot, 58th St. & 1st Avenue, Brooklyn, N. Y.—Capt. Byron A. Falk, Signal Corps. Office, Chief Signal Officer, 3422 Munitions Building, Washington, D. C.—Capt. A. M. Shearer, Signal Corps. Procurement Planning Section.

Urdika Wire Die Works. 125 Fulton Street, New York, N. Y.—Wm. Hanemann, President; Anthony Gentile, Foreman. 127 Lincoln St., Jersey City, N. J.—Alfred Nadler, Mill Supt. Jersey City Plant.

Vail Mfg. Company, 1752 E. 75th St., Chicago, Ill.—W. J. Vail, Prest.

Vanott Machine Corp., 216 Colgate Ave., Buffalo, N. Y.—Walter De F. Abbott, Manager.

Vaughn Machinery Co., Cuyahoga Falls, O.—L. A. Vaughn, President; A. T. Yungman, Vice-President; E. J. McIlloiried, Chief Engineer; E. Daugherty, Sales Engineer.

Vianney Wire Die Works, 100 Fifth Ave., New York, N. Y.—Mr. Renoir, Supt. of Mill.

Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.—Wm. D. Pierson, Secretary.

Welding Eng. & Research, 30 Church Street, New York, N. Y.—W. T. Kyle, President.

Western Cartridge Co., Alton, Ill. —Mr. Kipps.

Western Electric Co., 22nd & Cicero Ave., Chicago, Ill.—H. P. Arkema, Development Engineer, Hawthorne Works; C. P. Beath, Development Eng. on Copper Mine; H. Blount; E. W. Larsen, Machine Design, Dept. Chief; D. C. Robson, Machine Designer; D. W. Waters, Development Engineer; Mr. Knauss. 5939 W. 66th St,. Clearing, Ill.—H. D. Piper, Engineer; Mr. Colbeck. 1317 So. 61st Ave., Cicero.—W. J. Shaw, Foreman.

Westinghouse Elec. & Mfg. Co., 814 Ellicott Square, Buffalo, N. Y.—T. I. Messenger, Sales Engineer. East Pittsburgh, Pa.—J. H. Belknap, Mgr. Control Eng. Dept.; C. P. Croco, General Engineer; E. P. Taugher, Control Engineer.

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Wheeling Steel Corp. Portsmouth, O.—George Paff, Supt. Rod & Wire Dept.; Jos. Paff.

Wickwire Brothers, Cortland, N. Y. —H. L. Edick, Asst. to President; F. A. Wilkins, Wire Mill Supt.

Wickwire Spencer Steel Co., Buffalo, N. Y.—B. L. McCarthy, Chief Chemist & Metallurgist; Mr. Toisman. Robert E. Gardner, Electrical Supt.; J. L. Hott, Plant Engineer. Palmer, Mass.—Mr. Whitman, Asst. Supt. Morgan Works, Worcester, Mass.—E. F. Early, Asst. Supt.

J. H. Williams & Co. 73 Vulcan Street, Buffalo, N. Y.—T. A. Fortune, Foreman Tool Dept.; Frank P. Weisbeck, General Foreman.

York Insulated Wire Co., York, Pa. —M. H. Owen, Sales Manager.

Youngstown Sheet & Tube Co., Youngstown, O.—A. C. Badger. Metallurgical Engineer; F. H. Krehl; Mr. Schillinger. 1405 Liberty Bank Bldg., Buffalo, N. Y.—D. C. Williams.

The World's Wire Drawing Practice

(*Continued from page 266*)

tage in competition with Germany and Belgium, for those countries work with a cheaper raw material and have a decidedly lower labor rate and less Union domination. Even in the home market Great Britain is pushed hard by Germany and Belgium and the home market in any event is small. The domestic requirements in nails are very small indeed. There are no wooden houses built in England. The British do not even require nails for scaffolding work. They use for this purpose long poles of seasoned hardwood clamped or lashed together and when the job is over the scaffold is taken down carefully and stored away. There may be some wire fences in Great Britain but I have never seen them. The typical British fence is a ditch, a hedge, a stone wall or a neat wooden fence built of seasoned hardwood and entirely without nails. As for bale ties, so far as I can see, life in England is so adjusted that there is practically nothing to bale. There is a good market for poultry netting and galvanized wire mesh in general but German and Belgian competition in this market is positively deadly.

Great Britain's real forte is high grade wire products, notably rope wire. It is generally conceded that in these products she has no superior. Extreme care and extreme conservatism characterize British manufacture in these lines. There is absolutely no compromise with what is known to be good pratice.

There is a general belief in Great Britain that the Americans cannot make good wire and I have had many a hot argument on this point. I maintain that Americans can make just as high quality wire as anyone and that they do so in cases where high quality is of prime importance but that they do not worship quality for its own sake. Americans are always ready to make a compromise in the direc-

GLOBE DIAMOND DIES

for Wire Drawing

We have concentrated on the following four outstanding points, required to make a perfect die, with the following results:
1. We use utmost care in the selection of HIGHEST QUALITY GLOBULAR DIAMONDS.
2. Our PATENTED REINFORCED STEEL SETTING has been further improved, and now the diamond is at no time exposed to a greater heat, than is required for brazing with silver solder.
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SALT ANNEALING POT

Forge Fire Hammer Welded

Fabricated of a special analysis of high grade open-hearth steel—
All seams forge fire hammer welded by our own method.

These pots furnished in any practical size or shape — In any thickness of material required.

THE SHELL OR BODY OF THE POT
CAN BE FURNISHED EITHER
STRAIGHT OR TAPERED AS SHOWN

Annealing Pots To Fit Your Need

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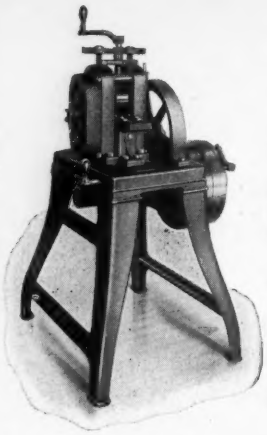

Flat Wire Rolling Mill

Used on small sizes of flat wire from rounds or flats.

Tool steel rolls.

6" diameter x 2¼" face.

Roll arbors arranged for water cooling.

Parallel adjustment of upper roll.

Complete with guide table—Either belt or motor drive.

Machinery for the manufacture of rod, wire and cable — Special Machinery.

The Torrington Mfg. Co.
Torrington - Conn, U.S.A.
44 Franklin St.

VIANNEY

Famous Wire Drawing Diamond Dies

MAIN PLANT: TREVOUX, FRANCE

Other French Plants Located at Vezeronce & Le Creusot

NEW YORK Office and Plant, 100 FIFTH AVENUE

tion of low cost where low cost is the important factor. I believe it is a fact however, that British wire averages distinctly better than American wire. Why shouldn't it? On account of Union restrictions the British wire drawer has no interest in production. He must have his little hobby so he specializes in quality and takes pride in it. It is very nice to hold nail wire to a tolerance of one-half a thousandth but what does it get you? A carpenter never carries a wire gauge and I never heard of a carpenter refusing to drive a nail because there was a scratch on it. Another reason why common wire is apt to be better in Great Britain is that in that country the fabricating plants as a rule are not affiliated with the wire mills. An American wire mill delivers nail wire to its own nail factory and there is of course a certain amount of give and take in the matter of quality. There is no such affiliation in England. A wire maker sells wire and nothing else and the buyer tightens up on his restrictions just as far as a competitive market will follow him.

British rods are always cleaned in muriatic acid. The sole reason for this practice is that in Great Britain muriatic acid is cheaper than sulphuric. I never could see that this practice had any effect on other details. The wire takes the sull coat in the same way, is subject to acid brittleness and requires the same kind and amount of baking. The use of muriatic acid does however permit the use of stone acid tube whose life is practically indefinite. Muriatic acid is of course a gas dissolved in water and cannot be heated without considerable loss of acid. It is used at a very moderate temperature and stone tubs whether of the one piece or the slab variety are in no danger of cracking.

Sweden

In Sweden we find a compromise between the American and British practice on the one hand and the general Continental practice on the other, or in other words, a compromise between

dry and wet drawing. In Sweden wet drawing begins at a considerably coarser gauge than here. Sweden is, so far as I know the only European country in which cast iron wire drawing dies can be seen in service on steel wire. Right here I want to point out that the word steel has different meanings in America and in Europe. In America, steel is anything that is worked out of an ingot. In Europe on the other hand, low carbon steel is always referred to as iron and the word steel is reserved for the high carbon products. Where we speak of low carbon wire and high carbon wire, the European speaks of iron wire and steel wire. Misunderstandings are constantly arising on this point.

In the common products mills of Sweden the most striking thing is the fact that the nails seem to be all made from square wire. I am told that there is practically no market for round wire nails. The Swedes seem to believe that their native pine is so hard that round nails will split it. Much of this Swedish pine is exported to foreign countries where it is promptly fabricated with round nails, but this makes no difference to the Swedes. This wire is drawn down in the usual way in cast iron dies, with lime coating and a soap lubricant until the sectional area of the round wire is nearly correct. It then gets two drafts through dead rolls mounted in a small housing in place of the die box. The first pass produces a round edged square, the last pass deeply indents all four sides of the square so that the cross-section of the finished wire is very much like a four-pointed star with blunt points.

The Swedish wire mills of course specialize in high carbon products. The common run into very stiff German competition and also into a very odd form of domestic competition of which I will speak later. The typical Swedish wire mill, in order to get volume, is obliged to mix common products and

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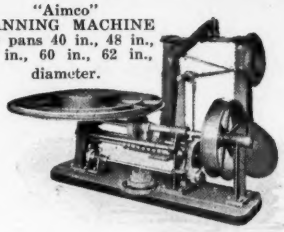
AUTOMATICALLY places RUBBER COVERED WIRE in sheet metal pans for vulcanization, SAVES WAGES OF AN OPERATOR and INCREASES PRODUCTION SPEED of Tubing Machine 25% to 50%.

"Aimco" PANNING MACHINE for pans 40 in., 48 in., 56 in., 60 in., 62 in., diameter.



MAGNET WIRE INSULATING MACHINES. WIRE ENAMELING MACHINES. HIGH-SPEED WIRE-DRAWING MACHINES.

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Copper	Pure Tin
High Brass	Commercial Bronze
Low Brass	Silver Plated Copper
10%, 18%, 30% Nickel Silver	False Gold
Zinc	Copper Lahn
Lead	Gold Lahn

Silver Plated Copper Lahn

BRUSH WIRES

CRIMP AND STRAIGHT

Brass	Nickel Silver
Steel	Phosphor Bronze

Copper

HUDSON WIRE CO.

Successors Royle & Akin

Fine Wire Manufacturers

OSSINING Established 1902 NEW YORK

high grade specialties in a way that would seem very odd to an American manufacturer.

Now with regard to the domestic competition of which I spoke in a preceding paragraph. This is a strange story and you may believe it or not as you see fit. It seems that wire drawing in large sections of Sweden is practically a cottage industry. Many of the Swedish farms have a little water power and in many cases a water wheel and a work shop. On the end of the wheel shaft is a bull block and there is a power-driven line shaft which is belted to an intermediate and a fine wire frame, a nail machine and perhaps one or two other wire fabricating units. There is likely to be a hand loom over in the corner and possibly a galvanizing pot. After the crops have been gathered in the fall, the farmer buys a few hundred or a few thousand pounds of wire rod from a German broker, calls in the hired man and all the boys and settles down to make up next year's requirements of wire products. If there is a bad season and no crops, or if, on the other hand, there is a good season and prices are all shot, farming is abandoned and all hands turn to and draw wire. The German brokers supply wire rods, take back the wire products at a slight advance over rod cost, and throw these products onto the Swedish market at cut-throat prices. The effect of this sort of competition on the common products market can better be imagined than described. This story seems absolutely incredible but it was related to me by the manager of the largest common products mill in Sweden and confirmed by several other manufacturers.

(*Concluded in August issue*)

WIRE DRAWING DIAMOND DIES

IN NICKEL STEEL SETTINGS

Manufacturers for Over 35 Years

F. KRAUSE & CO., Inc.

250-252-Ogden Ave.
JERSEY CITY, N. J.

Recent Developments in Wire Machinery

(*Continued from page 267*)

is the practical speed at which process wire can be run off from a swift. Consider if you will, .080 in. annealed and cleaned wire, when run off from a 22 in. coil onto a 16 in. block, if the latter runs at 65 rpm it is a fair practical speed, this means the swift will revolve at 31 rpm, and, as stated before, the swift speed governs the production possible. To bring the man production up to its highest point we must provide the man with a number of blocks. Thus we have the common 16 in. frame with 10, 12 or 14 blocks, and a corresponding number of dies and swifts. A fair average day's production of .080-.036 in. is about 2,000 lbs.

One Man Operates Four Blocks

With the continuous machine the same man will operate four finishing blocks at 150 rpm and produce 4,000 lbs. of wire, but in this case his swift will have to run at only 22 rpm. This, to my mind, is one of the great advantages of continuous wire drawing, the raw wire starts slowly through the first die where the coating is formed and gradually increases in speed as it warms up and passes through the following dies, we start at 128 ft. per minute and finish at 630 ft.

There are numerous other advantages beside greater production, such as, no shorts; less scrap; fewer tangles; breaks; and small bundles of finished wire. My own experience has been that the average gage of finished wire on a continuous

machine is better than any frame drawn wire and with the present alloy dies available the gage should be almost perfect even with the largest bundles.

And now we come to the first designed of all continuous wire drawing machines. The 8, 10 and 12 draft wet machine, finishing from .025 to .007 in. and when required to .004 in. and smaller. These machines, of which there are thousands in operation, have practically replaced the old 8 in. frames, and proven great money savers. Let us take one example, drawing .010 from .028 in. for weaving wire. The old process was to draw out two holes from .040 to .028 in. on a 16 block 8 in. frame, then finish six holes on a 40 Block 8 in. Frame, to .010 in., requiring 56 Blocks, dies, tubs and swifts to complete the operation with an average man day production of not over 600 lbs., and with this the finishing frame would have to run till after midnight.

This method has been almost entirely replaced by the continuous machine in which case the operator receives his wire at .028 in., and with three finishing machines, or six Blocks, running at 350 rpm, requiring only six wet tubs and swifts, the man will produce 900 lbs. in 10 hrs., and if his machines are allowed to run out at night it is possible for him to produce over 1,000 lbs. per day. To the wire mill man formerly contending with the old 8 in. 40 block frame, which produced no end of shorts, from .026 to .010 in., and scrap galore, the continuous wet machine is a godsend. With this he can not produce the intermediate sizes, and is confronted with only one problem. His wire will either run to .010 in., or it will not run at all. If it does not run he may blame the machine, but will usually find his trouble is not with the machine itself, but some previous operation.

Study Possibilities Before Installing

To discuss the merits of the various types of continuous machines on the market today would be out of place in this paper, suffice to say there are a number of different types available, and the particular needs of any one mill can best be filled by a study of the possibilities of the various machines offered.

To close, let me say again, that the newest developments in the wire drawing art consist of alloy steel dies, better raw material and continuous machines for all sizes of finished wire.

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SELECTED DIAMONDS—GUARANTEED WEIGHTS

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Galvanizing Prevents Metallic Decomposition

(*Continued from page 267*)

tion with the use of zinc chloride as a fluxing medium I suggest the use of zinc ammonium chloride as a bath flux cover on the in-go section of the kettle. It will be found that the use of this material in this connection will have a decided effect upon the bonding of the zinc coat.

I would like to say to you in connection with this bath cover that I have recently developed a substitute for zinc ammonium chloride which will make for great economy in this step of the operation but although tests have been completed on this product it has not yet been placed upon the market. This volatile flux will be of great interest in other fields, such as pipe, sheets and castings, where great quantities of sal ammoniac are now used. You will all probably hear of this material in due course in the near future.

The Waterbury Wire Die Co.

Diamond, Composition and CHILLED IRON DIES

Waterbury, Conn.

In summarizing this point I wish to say that I have found that in every case of change-over of the type just suggested, from hydrochloric to the wash, zinc chloride method has resulted in at least a 50% reduction. in dross accumulation.

The Elimination of Zinc Oxide

Next to the dross loss in the galvanizing operation comes the losses resulting from the oxidization taking place on the top of the kettle. Recent developments in the field have tended to practically eliminate this loss. I have recently recommended to

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Wire Cutting and Straightening Machines

Machine No. 110

Cutting Lengths 1/64" to 4". Wire Sizes .002 to .040. Production 75-125 Per Minute, Depending on Length. Machine is of sturdy and compact construction. Many Types and Styles, for all classes of work. Send for our Wire Cutting Machine Pamphlet.

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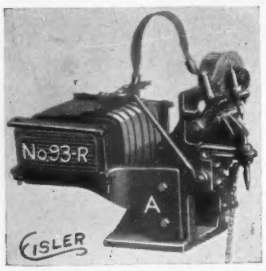
Suitable For Extremely Light and Fine Welding.



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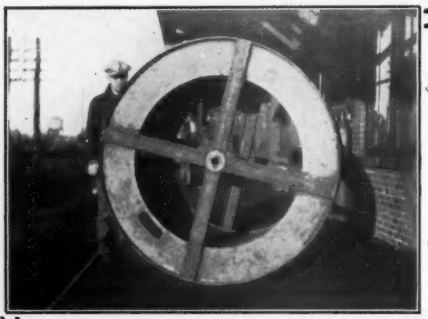

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the wire field a non-volatile bath blanket known as "Anti-Oxide", the use of which will eliminate this residuum if used with the procedure just outlined.

The Effect of Alloy Layers on Bonding

In every zinc coating operation there forms between the base metal and the pure zinc layer a series of alloy layers. Microphotographs of zinc coatings show distinctively three of these layers. The one nearest the base metal is very high in iron. The middle one still high in iron but somewhat less. The outer layer somewhat lower in iron. These layers, it has been shown, are present in every coating of zinc even though the immersion in the zinc be for so short a period as for 1/20th of a second. These alloy layers are extremely brittle and will fracture under bending very easily.

The particular type or structure of the alloy layers is of importance also. Microphotographic examination of these structures leads to the definite conclusion that the technique of the operation must be such as to reveal an even or smooth line of demarcation. If the alloy layers prove to be irregular or "tree-like" in appearance, this irregularity will invariably lead to an easy fracture. The method of introduction of the wire into the zinc has much to do with this and is an important reason for the use of zinc ammonium chloride as a bath flux.

It is also invariably the case that the wider the alloy layers the more irregular will they be which adds another reason for retarding the alloying action of the heat as quickly as possible.

(*Concluded in August issue*)

Arthur W. Taylor, plant manager of Page Steel & Wire Co., Monessen, Pa., for the past 10 years, since it became the property of American Chain Co., has retired effective June 1, and has been succeeded by C. N. Johns, his assistant for that 10-year period. Mr. Johns previously was employed by Page Woven Wire Fence Co.

Domestic Exports and Imports of Wire and Wire Products

Exports of iron and steel wire and wire products from the United States in March and April, 1930

(In gross tons)

Item	April 1930	March 1930	April 1929	Year through April 1930	Year through April 1929
Wire rods	4,299	4,684	4,551	16,837	17,089
Plain wire	3,339	2,729	4,142	11,042	18,820
Barbed wide and woven wire fencing	4,763	3,319	5,137	13,380	23,884
Wire cloth and screening	102	136	116	569	610
Wire rope	468	295	586	1,743	2,678
Insulated wire and cable	44	109	48	275	434
Other wire and manufactures	650	743	785	3,078	3,921
Wire nails	666	853	1,069	2,568	6,207
Nails other than wire	510	442	1,355	2,078	2,942
Tacks	60	40	54	109	1,228
Bolt, nuts, rivets, except track	908	977	1,281	4,252	5,687

Imports

Imports of iron and steel wire and wire products into the United States

(In gross tons)

Item	April 1930	March 1930	April 1929	Year through April 1930	Year through April 1929
Wire rods	1,019	1,355	1,339	4,433	4,482
Barbed wire	406	312	742	1,790	1,993
Round iron and steel wire	487	485	778	1,694	2,504
Steel telegraph & telephone wire	16			17	
Flat wire and strip steel	114	132	160	555	595
Wire rope and strand	311	225	193	988	802
Other wire	19	64	47	159	187
Nails, tacks and staples	322	444	549	1,635	2,362
Bolts, nuts, rivets and washers	58	22	26	155	93

FOREIGN trade in April both exports and imports did not hold up to the high level of March. Exports were less by 12½% or 29,693 tons while imports were off 5.3% or 2,954 tons. The chief loss in exports was in skelp, barbed wire showing an increase of 1,444 tons. Principal losses in import tonnage was in structural shapes altho wire rods lost 336 tons.

Receipts of card clothing totaled 24,225 sq. ft., valued at $35,399—the United Kingdom supplying 23,498 sq. ft. ($33,-424) and Switzerland the remainder. Imports of wire cloth and screening again rose and, in April, amounted to 53,694 sq. ft.

Anti-friction Bearings in Wire Equipment

(*Continued from page 271*)

too numerous even to mention. In most instances the method of applying the bearings, is, allowing for special problems

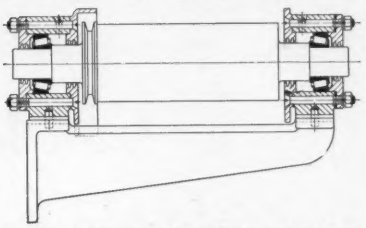

Fig. 10. Arbor Assembly of Wire Straightener.

involved, very similar to those that have been described. And, generally speaking, the results follow the same general outline of increased effectiveness at a lower expense for all items included in categories of operating and maintenance costs.

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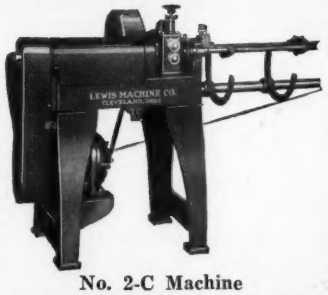
Efficient V Belt Motor Drive, Timken Roller Bearing Equipped. Built to endure hard service. Sizes up to ½" diameter wire.



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DIAMOND DIES

Highest Quality

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British Revise Specification for Power Conductors

A revision of the British standard specification for hard-drawn copper solid and stranded circular conductors for overhead power transmission purposes, issued in 1924, has just been published by the British Engineering Standards Association. The revision lays down standards for the mechanical and electrical properties and prescribes appropriate tests. The tables of size of conductors for primary and secondardy standards remain as before, and the alterations introduced into the specification are of a minor character, designed to bring it into line with the 1930 revision of the specification for aluminum overhead lines.

Brief Personal Mention

Richard L. Foster, who has been assistant general manager of sales of the American Steel & Wire Co., with headquarters in New York, has resigned to become general manager of sales of the Wickwire Spencer Steel Corporation and its subsidiaries, the American Wire Fabrics Corporation and the Wickwire Spencer Sales Corporation. Mr. Foster has been connected with the wire business since 1901. In 1921. when the Pearson business was merged with that of the American Steel & Wire Co., Mr. Foster was appointed manager of the merchant sales department at New York, and in 1922 he was made assistant general manager of sales of that company in charge of the Eastern territory.

—

F. T. Sisco, for 6 years chief of the research metallurgical laboratory, U. S. Army air corps, Wright field, Dayton, O., has been appointed editor of the *Alloys of Iron Research,* organized by the Engineering Foundation Inc., New York, for the purpose of furthering fundamental research on iron and its alloys. Mr. Sisco has had 16 years experience in the iron and

BUYERS' GUIDE

For more complete information, consult the annual Directory, Index & Buyers' Guide.

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ANNEALING SALTS
European Color & Chemical Co., Weehawken, N. J.

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E. J. Scudder Foundry & Machine Co., Trenton, N. J.

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Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

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Abr. Levine, New York

DIES—Chilled Iron
Waterbury Wire Die Co., Waterbury, Ct.

DIES—Diamond
Atlas Wire Die, Co., New York, N. Y.
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11. Furnaces for Steel Treating. Stationary Hearth Furnaces
12. Bath Furnaces: Labor Saving Furnaces
13. Pyrometers
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16. Labor, Supervision and Cost Appendix —Heat-treatment Definitions

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Specializing in Galvanizing Plants Designed and Installed
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Steel and Copper Wire
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steel industry including 10 years plant and laboratory experience with the Illinois Steel Co., Hess Steel Co., United States naval ordnance plant, and American Steel & Wire Co.

—

S. P. Buffum, who since 1928 has been sales agent in the Pittsburgh office of Pittsburgh Steel Co., has been appointed district sales manager at Dallas, Tex., succeeding the late Harry B. Webster. His headquarters are in the Kirby building, Dallas. Mr. Buffum has had 22 years' experience in the wire branch of the steel industry, having been connected with American Steel & Wire Co. for 11 years prior to becoming affiliated with Pittsburgh Steel in 1919.

—

J. A. Voss has been appointed safety director of the Republic Steel Corp. Mr. Voss, formerly was safety director of the Central Alloy Steel Corp. at Massillon. He will be located at Youngstown and will have charge of safety matters of all plants of the corporation.

—

H. S. Schroeder has been appointed western manager of sales for the Republic Steel Corp., with headquarters in Chicago. Mr. Schroeder formerly was vice president and general sales manager of the Inter-state Iron & Steel Co., Chicago.

—

O. C. Steinert, formerly chief engineer of Pittsburgh Steel Co., Pittsburgh, has become affiliated with the engineering force of Blaw-Knox Co., Blaw-Knox, Pa. His main effort will be in the development of equipment for steel plants.

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Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson.

MACHINERY—Cable, Electric
W. E. Somerville & Co., Coal City, Ill.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Company, Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Coiling
Broden Const. Co., Cleveland, O.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Cutting
American Insulating Mach'y Co., Phila., Pa.
Eisler Electric Corp., Newark, N. J.
Hallden Machine Co., Thomaston, Conn.
Lewis Machine Co., Cleveland, O.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
W. E. Somerville & Co., Coal City, Ill.

MACHINERY—Forming
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Galvanized Wire
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Insulating
American Insulating Machinery Co., Phila.
New England Butt Co., Providence, R. I.

MACHINERY—Magnet Wire Enameling
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Measuring Wire
New England Butt. Co., Providence, R. I.
Watson Machine Company, Paterson, N. J.

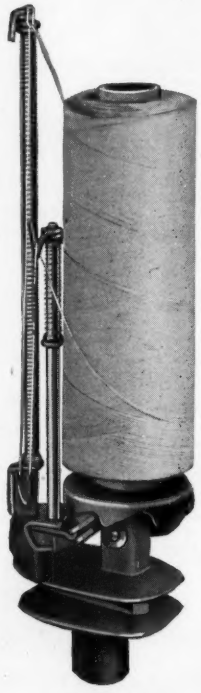
MACHINERY—Measuring Wire Rope
W. E. Somerville & Co., Coal City(Ill.

MACHINERY—Nail
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Panning
American Insulating Machinery Co., Phila.

MACHINERY—Pointing
Morgan Construction Co., Worcester, Mass.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
The Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rivet
The Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.



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Mosspeed Braider Carriers

For Increased Production at Lower Operating Cost And a Better Braid

THESE carriers with their patented spring tension take-up, have won out in the battle for increased production at a lower operating cost. Hundreds of thousands of Mosspeed Carriers are turning ordinary Maypole-type braiders into high-speed machines. In many instances, the effective braiding speed has been increased up to 80%. And at the same time a better braid is produced at a decided saving in yarn. Hundreds of manufacturers have found in Mosspeed Carriers the means to make money in a highly competitive market.

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PRESSED STEEL CORP.
Attleboro --- Massachusetts --- U. S. A.
Greenville, S. C. Dallas, Texas

Selson Engineering Co., Ltd., 26-28 Charles St., London, E.C.1.

BUYERS' GUIDE, Continued

MACHINERY—Rod
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Screw Wire
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Spooling
American Insulating Machinery Co., Phila.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Torrington Mfg. Co., Torrington, Conn.
W. E. Somerville & Co., Coal City, Ill.

MACHINERY—Spring Making
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Eisler Electric Corp., Newark, N. J.
Hallden Machine Co., Thomaston, Conn.
Lewis Machine Co., Cleveland, O.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Stranding
American Insulating Mach'y Co., Phila Pa.
New England Butt Co., Providence, R. I.
W. E. Somerville & Co., Coal City, Ill.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Sleeper & Hartley, Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrell Foundry Machine Co., Waterbury, Conn.

MACHINERY—Taping
Amer. Insulating Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Watson Machine Company, Paterson, N. J.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Welding
Eisler Electric Corp., Newark, N. J.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
W. E. Somerville & Co., Coal City, Ill.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Manufacturing Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
W. E. Somerville & Co., Coal City, Ill.
Watson Machine Company, Paterson, N. J.

MACHINERY—Tube
Torrington Mfg. Co., Torrington, Conn.

NEUTRALIZING COMPOUNDS
Oakite Products, Inc., N. Y.

PATENTS
Lancaster, Allwine & Rommel, Washington, D. C.

PICKING APPARATUS
Weaver Bros. Co., Adrian, Mich.

PICKLING COMPOUNDS
Weaver Bros. Co., Adrian, Mich.

POTS
Columbiana Boiler Co., Columbiana, O.

PULLERS—Wire
E. J. Scudder Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

REELS
American Pulley Co., Philadelphia, Pa.
Apco-Mossberg Co., Attleboro, Mass.
R. B. Hayward Co., Chicago, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

REEL CRUTCHES
Watson Machine Co., Paterson, N. J.

SOAPS—Wire Drawing
R. H. Miller Co., Homer, N. Y.
J. T. Robertson Co., Syracuse, N. Y.

SOLDER
Kester Solder Co., Chicago, Ill.

SOLDER—Silver
Handy & Harman, N. Y.

SPOOLS—Wire & Cable
American Pulley Co., Philadelphia, Pa.
Apco-Mossberg Co., Attleboro, Mass.
R. B. Hayward Co., Chicago, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

VULCANIZERS
Watson Machine Co., Paterson, N. J.

WIRE—Various Kinds
Copperweld Steel Co., Glassport, Pa.
Hudson Wire Co., Ossining, N. Y.

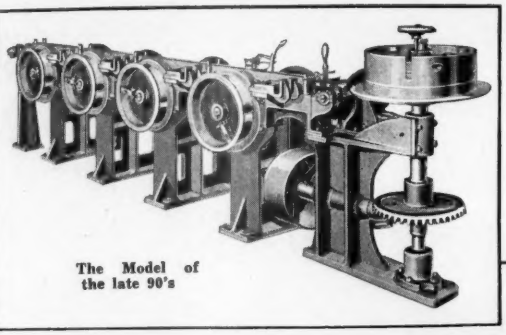
This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in WIRE & WIRE PRODUCTS. Please mention WIRE when writing to these firms.

WATERBURY-FARREL TANDEMS

Three Decades Perfecting Continuous Wire Drawing Machines

We thought the old machines were pretty good in the old days (and they were) but times have changed. Today we offer not a better method nor a new principle, but—a far better machine that meets in eloquent fashion every demand of the present day—

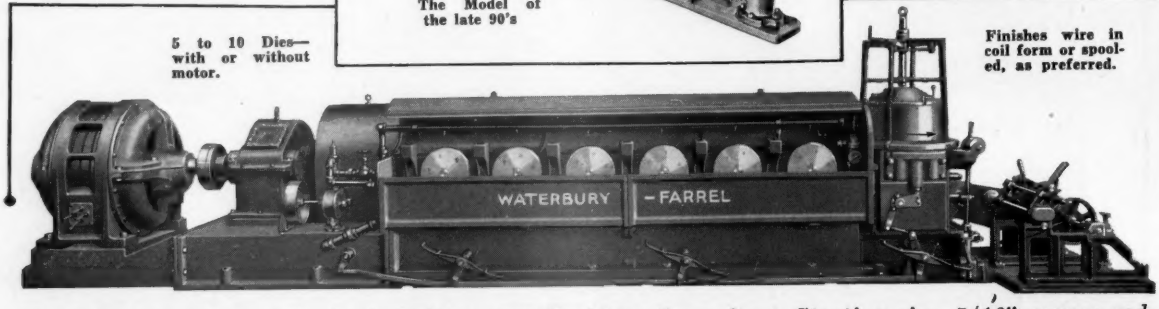
High Speed
Low Operating Cost
Mechanical Efficiency



The Model of the late 90's

5 to 10 Dies—with or without motor.

Finishes wire in coil form or spooled, as preferred.



No. 1 Machine. Forced feed lubrication. Ball Bearings throughout. Starting size, 5/16" copper rod.

The Waterbury Farrel Foundry and Machine Company

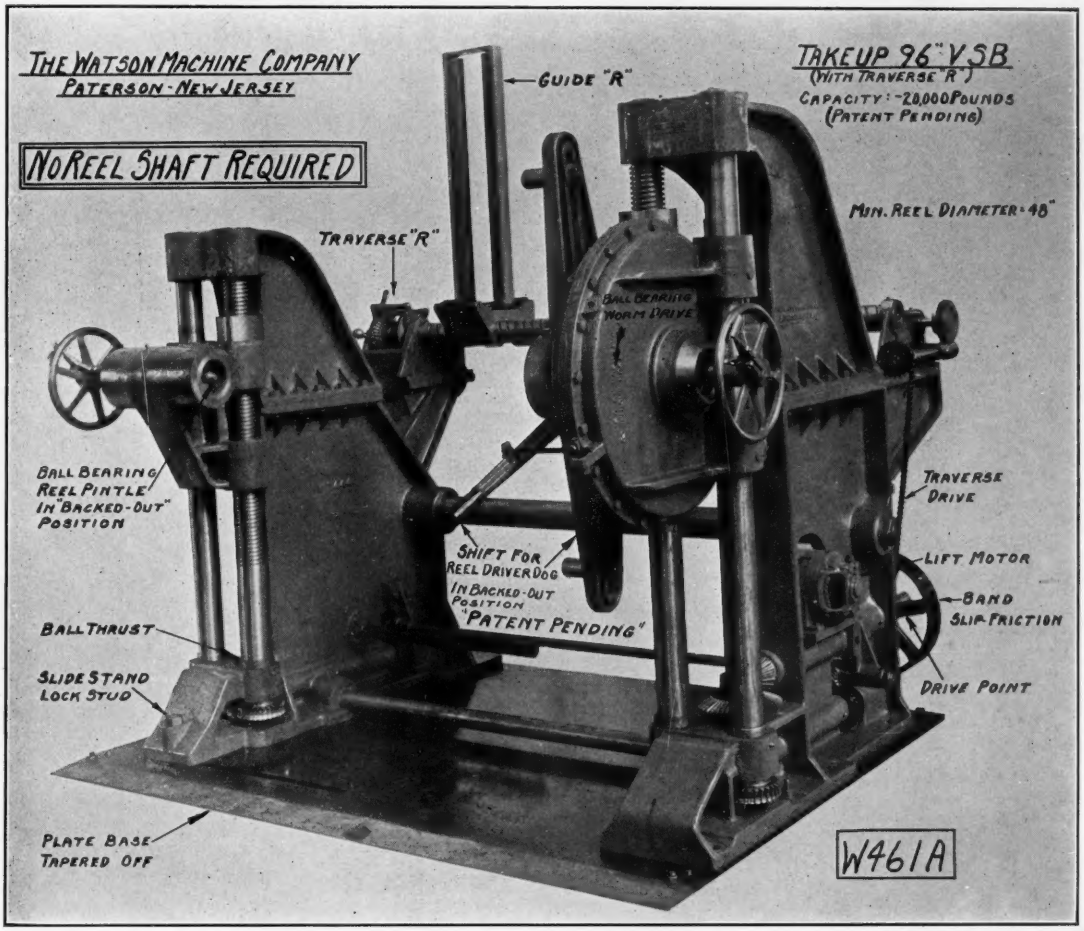
Home Office and Works: Cottage Place, Waterbury, Connecticut **Western Sales Office: Cleveland, Ohio**

THE WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.

ENGINEERS - FOUNDERS - MACHINISTS



A New Development, Eliminating the Handling of Reel Shafts

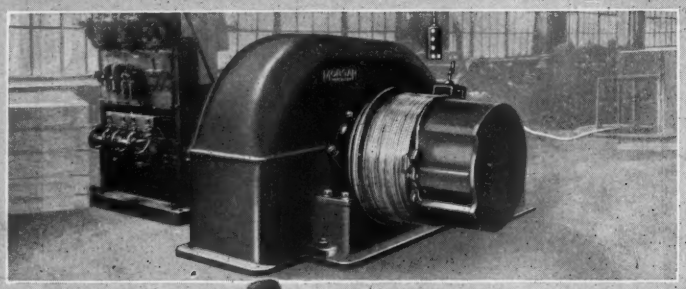
Also Built in 72" Size for 5-Ton Load

ELECTRICAL WIRE AND CABLE
WIRE ROPE and CORDAGE MACHINERY

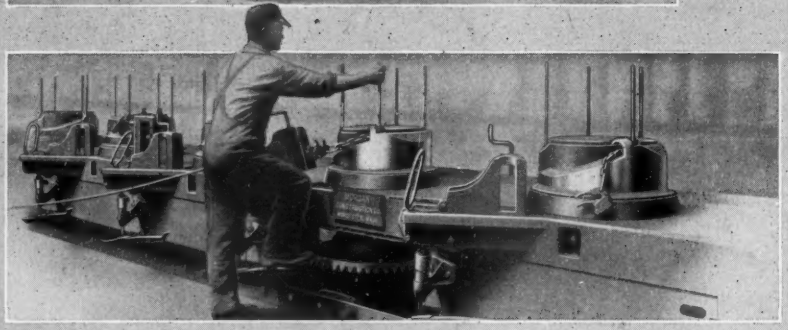
MORGAN CONSTRUCTION COMPANY
WORCESTER, MASS., U. S. A.

European Representatives—International Construction Company
56 Kingsway, London, W. C. 2 Davy Bros., Sheffield, England

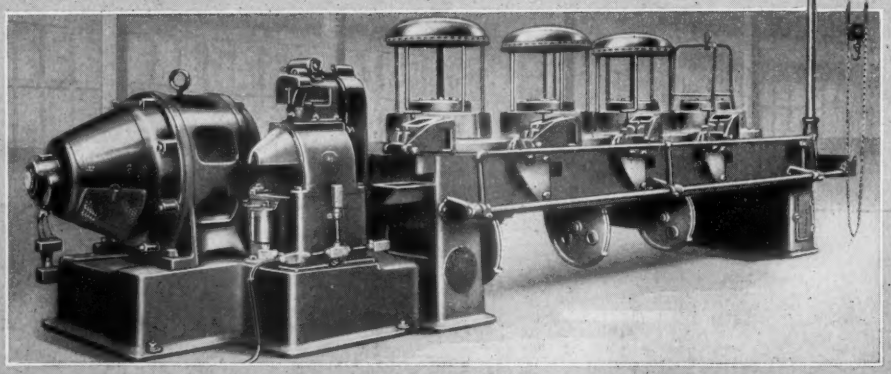
Direct Motor Connected
Bull Blocks
Vertical and



Horizontal



Rod Frames



Continuous
Wire
Machines

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ENGINEERS AND MANUFACTURERS